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EQUIPMENT

AUGUST 3

1953

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Korean truce won't have much effect on manufacturers. Build-up of Air Force to 110-114 wings by next June, and concurrent modernization of Navy's air arm continue. Money has been appropriated.

Air Force build-up may be slightly speeded because plane losses in Korea will no longer have to be replaced. AF has been spending $560 million yearly on the war, but truce won't mean much saving—planes and troops must still be maintained in Korea.

Truce may mean some decrease in airline business, but extent remains to be seen. Load factors softened in two weeks before cease-fire, and some officials don't believe the drop was entirely due to increased capacity. Operators are cautiously optimistic about domestic military contract flights; they don't look for a sudden decline.

•

Air Force goal has been settled by Congress—at least for the time being—after much haggling over the defense budget. It's 120 wings, to be reached by June 30, 1955, according to Defense Secretary Wilson. The 143-wing program is discarded, officially. It was an Administration victory—as expected.

New Joint Chiefs of Staff can change this, of course. Their review of entire defense picture is due in November. If they decide on 143, attainment of the goal will be delayed at least a year beyond previous target date of January 1, 1956.

The 120-wing AF will have 104 combat and 16 transport wings until 1956. Then it will switch to 106 and 14. Two transport wings are scheduled for transfer to Air Reserve, to be replaced by two fighter-bomber wings.

•

Navy is in unusual position of having to go to Air Force for jet engines. John Floberg, outgoing Assistant Secretary of Navy for Air, says slow development of jets and turboprops for Navy was biggest disappointment of his tenure of office.

It's probable that enough Pratt & Whitney J57, Allison J71 and General Electric J73 turbines will be available to fill Navy requirements. It's unlikely, therefore, that Navy will have to establish its own sources of supply for these engines.

AF has turned to Navy for turboprops—but for a different reason. Navy started turboprop development way ahead of AF.

•

Heavy press program is now definitely set by AF. There'll be 10 presses instead of 17. Further reduction of four, once discussed, has been discarded.

Question is who will operate the four. AF won't pay for facilities to house them. Negotiations are under way with Kaiser Aluminum (Halethorpe, Md.), Reynolds Metals (Phoenix), and Harvey Machine (Torrence, Calif.). If any of these firms aren't interested in providing housing, AF will look elsewhere.

•

Guided missile work for the government may soon be performed, for the first time, by an airline—Pan American World Airways. Details are secret. Only statement Air Force will make is that it may contract certain "range activities" at Missile Test Center in Florida to PAA, with Radio Corporation of America as subcontractor.

•

One reason airlines couldn't agree on rates for experimental carriage of first-class mail was Post Office failure to give them answers to some important questions. Carriers didn't know (and still don't) what routes will be involved, expected volume, etc. Yet Postmaster General Summerfield said experiments would start in 60 days.

Legality of experiments still hasn't been cleared by Comptroller General, who pays the airlines. Feeling is that PO, although on the right track, moved too fast.

The Washington View

Getting Organized

With the Defense Appropriations bill out of the way and an end to the time-consuming Capitol Hill appearances that it required, Defense Secretary Charles Wilson has turned his attention to getting after some of the problems he's found in every-day Pentagon operation.

He has tackled the realignment of functions of the three services first. This includes a new look at the duties of the service Secretaries, cutting, adding and drawing definite lines of demarcation for responsibilities.

He's also moving ahead on the writing of charters for activities of new assistant secretaries, whose positions were created when President Eisenhower's Reorganization Plan No. 6 went into effect June 30. Since previous boards were eliminated, confusion is rampant at the Pentagon pending assignment of new executives in replacement.

For example, APRA at Dayton is filing reports although its previous boss, the Munitions Board, has disappeared. If he can be persuaded to sell his stock interests, Willard F. Rockwell will become Assistant Secretary of Defense for Supply and Logistics, taking over expanded functions of the former board.

There's also talk that Wilson may take over complete control of all Air Force, Army, and Navy research, assigning all such activities to the new Assistant Defense Secretary for Research and Development, a job slated to be filled by Donald A. Quarles, former vice president of Bell Telephone Laboratories. Wilson has insisted that there have been many "boondoggling" projects involving research and development funds and undoubtedly feels he could prevent this if R&D was under his office. If the move takes place, Air Force's Air Research and Development Command at Baltimore stands to lose many of its powers and functions.

Another Look at Spares

The Air Force's spare parts program, which has been under Congressional sniping for some time, is now slated for a further examination by Capitol Hill probers as soon as Congress goes into recess. This time, Sen. Leverett Saltonstall has made an issue of the Air Force's spare parts policies and practices.

As chairman of the Senate Armed Services Committee, Saltonstall also heads the Preparedness Investigating subcommittee, which presumably will conduct the inquiry he has called for. The Yankee senator has expressed great concern over "the whole question of Air Force spares," for which there is an unused balance estimated in excess of $11 billion.

Earlier this year, the House Appropriations Committee took note of the situation and put the Air Force on notice that a full explanation of its spares program would be required at the 1954 budget hearings before any further money would be made available.

New Names for Commerce

The death of Sen. Charles W. Tobey (R., N. H.) and the expected naming of Sen. John W. Bricker (R., Ohio) to succeed him as chairman of the Senate Commerce Committee, may result in some important committee staff changes. Included in the powers vested in a committee chairmanship, in addition to establishing policies and direction, is the right to pick the staff.

Although the late senator kept the same staff he inherited, he had set up a new position of staff director and named his own man, Robert D. L'Heureux, to the post. And then, more recently, in forming a new aviation investigating subcommittee, Tobey selected another of his staff appointees, Frank Keenan, as subcommittee clerk.

Senator Tobey's death made Sen. Homer E. Capehart of Indiana ranking Republican on the Commerce Committee, but he has decided to remain as chairman of the Banking and Currency Committee. This puts Senator Bricker next in line in Republican seniority to become Commerce Committee chairman. When he eventually takes over, Bricker is bound to want some changes made in committee policy as well as in personnel.

Here We Go Again

Washington's defense planners continue to confuse the aircraft manufacturers. When the Controlled Materials Plan was set up after outbreak of Korean war, materials for transport planes were given equal priority with military aircraft. However, no attention was paid to maintenance, repair, and operations (MRO) supplies. With the materials shortage at that time, the situation became acute before a priority was finally granted.

Defense Materials System has now replaced CMP. Again, transports have equal priority. And again, there's no provision for MRO. Manufacturers, upon receiving airline orders, must buy MRO materials on the open market, and as long as there's no shortage there'll be no problem. But they have no priority to fall back on in case of trouble.

. . . Preble Staver

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American Aviation Directory; twice yearly listing of products, people and organizations. $7.50 each. Managing Editor: Marion E. Grambow.

Official Airline Guide: Monthly publication of airline schedules and fares. $11 per year in USA and countries belonging to Pan American Postal Union, including Spain and the Philippines. $12.50 elsewhere. Published from 139 N. Clark St., Chicago 2, Ill. Central 6-5804. Managing Editor: Robert Farrish.

American Aviation Traffic News (incorporating Air Tariff Reports): Daily rates and tariff news. $150 per year. Managing Editor: Wallace I. Longstreth.

Where & When

Aug. 19-21—Western Electronics Show & Convention, Municipal Auditorium, San Francisco. Sponsored by IRE 7th Region and WCEMA.

Aug. 20-23—Air Force Assn., 7th Annual National Convention, Statler Hotel, Washington, D. C.

Aug. 27-29—Institute of Navigation, Annual Meeting, Coast Guard Academy, New London, Conn.

Sept. 5-7—National Aircraft Show & 50th Anniversary of Powered Flight, Dayton, Ohio.

Sept. 21-25—Instrument Society of America, 8th National Instrument Conference & Exhibit, Chicago.

Sept. 22-24—Aircraft Spark Plug & Ignition Conf., Champion Spark Plug Co., Toledo, Ohio.

Sept. 27-29—Int'l Northwest Aviation Council, 17th Annual Conference, Gearhart, Oregon.

Sept. 28-30—National Electronics Conference, 9th Annual Meeting, Hotel Sherman, Chicago.

Sept. 29-Oct. 3—SAE, Aeronautic Meeting & Aircraft Engineering Display, & Aircraft Production, Hotel Statler, Los Angeles.

Sept. 30-Oct. 1—AIEE, Aircraft Electric Equipment Conference, Seattle.

Oct. 1-3—Air Reserve Assn., Annual Meeting. Angebilt Hotel, Orlando, Fla.

Oct. 10-17—5th Annual All-Texas Air Tour. Information from Texas Aeronautics Commission, Walton Bldg., Austin.

Oct. 13-15—Air Transport Association, Annual Engineering & Maintenance Conf., Saxony Hotel, Miami Beach, Fla.

Oct. 14-15—New York State Dept. of Commerce, Annual Airport Development & Operation Conference, Onondaga Hotel, Syracuse.

Oct. 28-30—Southeastern Airport Managers' Association, Annual Convention, Marlin Beach Hotel, Fort Lauderdale, Fla.

Oct. 29-30—National Business Aircraft Assn. (formerly CAOA), 6th Annual Forum & Meeting, Park Plaza Hotel, St. Louis, Mo.

Nov. 3-4—Transport Aircraft Hydraulic Conference, sponsored by Vickers, Inc., Park Shelton Hotel, Detroit, Mich.

Nov. 3-6—National Association of State Aviation Officials, Annual Meeting, Edgewater Gulf Hotel, Edgewater Park, Miss.

Nov. 5-6—SAE, Fuels & Lubricants Meeting, Conrad Hilton Hotel, Chicago.

Nov. 16-17—American Society for Quality Control, Aircraft Quality Control Conf., Biltmore Hotel, Dayton, O.

Dec. 3-5—7th annual Arizona Aviation Conference, Yuma, Ariz.

Dec. 17—17th Wright Brothers Lecture (sponsored by IAS), U. S. Chamber of Commerce Auditorium, Washington, D. C.

INTERNATIONAL

Aug. 3-8—Int'l Astronautical Federation, 4th Annual Congress, Zurich, Switzerland.

Aug. 25—ICAO Legal Committee, Rio de Janeiro.

Sept. 7-13—SBAC Aircraft Show & Flying Display, Farnborough, England.

Sept. 7-18—IAS-RAeS, 4th Int'l Conference, London, England.

Oct. 5-10—IATA Annual Assembly, Montreal, Canada.

Oct. 10—International Air Race, England to Christchurch, N. Z.

Nov. 1-22—IATA, Traffic Conferences, Honolulu.

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Letters

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THE STORY OF FIDO

To the Editor:

This, my first letter to an editor, is prompted by your comment in "Extra Section" of the May 11th issue of AMERICAN AVIATION:

> "The Fido system at Eureka, California, which had such a hopeful career nipped in the bud by installation blunders, has now been largely torn up. It proved completely ineffective as installed."

As one who worked with this much maligned project (I had no part in the planning or installation of this system, but worked with it later to determine its possibilities), I must protest.

It must be remembered that this installation was developed over a period of time, and had its origin in something quite different, the British low pressure system. It was built for experimental purposes; not as a production model. With it we hoped to learn what could be done, something of component and installation costs, operational costs and techniques, etc.

Despite its inadequacies as an operational system (lack of funds prevented the installation of what was obviously needed), properly employed (i.e., when the weather present was properly assessed and a developed operational procedure used) it proved to be operationally useful on numerous occasions (see L.A.E.S. Final Report—1949). It was also authorized by the CAA for commercial use by Southwest Airways.

This installation proved to be of great value in meeting the need for which it was designed. It provided us with a working model on which different types of burner heads and configurations could be tested under severe fog conditions. Much was learned relative to costs of materiel procurement, installation, maintenance, and operation.

It served as a basis for the development of an instantaneous ignition system and a central remote control system, without which no fog dispersal system can be properly coordinated with flight operations and still remain economically feasible.

It provided us with a basis on which meteorological factors requiring such a system could be assessed, without which the indiscriminate use of the system can worsen a fog condition.

Most important, it permitted a determination of what circumstances, if any, might warrant the costs of such a system (see L. A. E. S. Thermal Fog Dispersal Manual—1950).

It is therefore my belief that the Arcata Fido installation more than justified the meager funds allotted to its investigation. Its "hopeful career" was not "nipped in the bud by installation blunders," but by the indifference of the many aviation interests in this country who might have shown at least a modicum of interest but didn't.

Failure of any U. S. airline except Southwest Airways to back this work may be considered contributory. During the last two years of its operation, the Landing Aids Experiment Station had no funds allotted for work on Fido. That considerable work was done resulted only from the overwhelming interest of the station employees, who contributed their time and efforts to this phase voluntarily.

This is being called to your attention since the impression gained from reading your comments did not jibe with the facts, as understood by one who was intimately connected with this project.

Permit me to use this opportunity to commend you on your most interesting and informative column.

G. H. STOCKER

Formerly in charge of L.A.E.S.
Meteorology Department
1435 Mills Court
Menlo Park, California

(Thanks to reader Stocker for his useful comments on the Fido installation. The fact that the Eureka installation was completed and that the industry gained so much useful information from it is a tribute to the individuals associated with the project. The fact remains that the Fido, regardless of its potential values, did not survive the installations made at Eureka and Los Angeles.—Ed.)

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TURBINE 'COPTER

To the Editor:

The article entitled "Turbine Boosts 'Copter Performance" in your May 25th issue contains a statement which we feel is unfair and misleading. Under "problems" there appears the statement that "The second stage fuel control governor, made by Woodward Governor Co., proved troublesome. Only after it was removed was constant rpm possible." The reasons for instability are quite obvious to one acquainted with the control problem, and the particular governor used could not possibly have given stable control. It was supplied only for overspeed protection for an entirely different application. That it had been used in this application and that an attempt was made to control rotor rpm through the governor was known to us only when we read the article. We do not believe that it is fair to imply that the second stage governor was defective, and such implication could do some harm to our reputation, particularly in the minds of those not familiar with the control characteristics of the two-shaft turbine.

As a matter of interest, stable control, with the particular governor involved, could have been obtained only with the polar moment of inertia connected to the power turbine increased about 50 times.

W. J. WHITEHEAD
Woodward Governor Company
Rockford, Illinois

(Apparently the U. S. Navy is not familiar with control problems. This was virtually a direct quotation from the official Navy report on the tests on which the entire article was based.—Ed.)

WING SHAPES

To the Editor:

The Directorate of Intelligence, Headquarters, Continental Air Command, publishes the *Air Intelligence Training Bulletin*, a monthly publication whose distribution is limited to certain military personnel. This publication strives to maintain intelligence proficiency of reserve personnel on inactive duty and to keep them informed on the latest developments in the aviation field.

In this connection, we are very much interested in reprinting the article by Walter Kilrain entitled "Hottest Fight in Design Today: Wing Shapes," which appeared in the March 30, 1953, edition of AMERICAN AVIATION. We request that permission be granted to reproduce this article.

A. M. CLARK

Lt. Colonel, USAF
Director of Intelligence
Headquarters, Continental Air Command
Mitchel AFB, New York

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FRENCH BATTERY

To the Editor:

With reference to the article on the new nickel-cadmium battery as covered on page 61 of the June 22, 1953, issue of AMERICAN AVIATION, would you please be kind enough to advise the address of the Societe Accumulateurs Fixes et de Traction (SAFT), as we would like to contact them on possibly testing some of these batteries in our own airplanes.

R. A. LATTA

Asst. General Purchasing Agent
Eastern Air Lines
Miami International Airport
Miami 48, Florida

(The address of SAFT is Pont de La Folie, Romainville (Seine), France.—Ed.)

•

BOATS DOWN UNDER

To the Editor:

I note under International Briefs in your issue of April 13 you refer to the South African Air Force replacing its Sunderland flying boats with Avro Shackleton land planes.

As a matter of interest, the Royal New Zealand Air Force is now in the process of replacing its Catalina flying boats with Sunderlands, of which it has two squadrons, one in New Zealand and one in Fiji.

The Catalinas have given excellent service through the years, but they are now time expired.

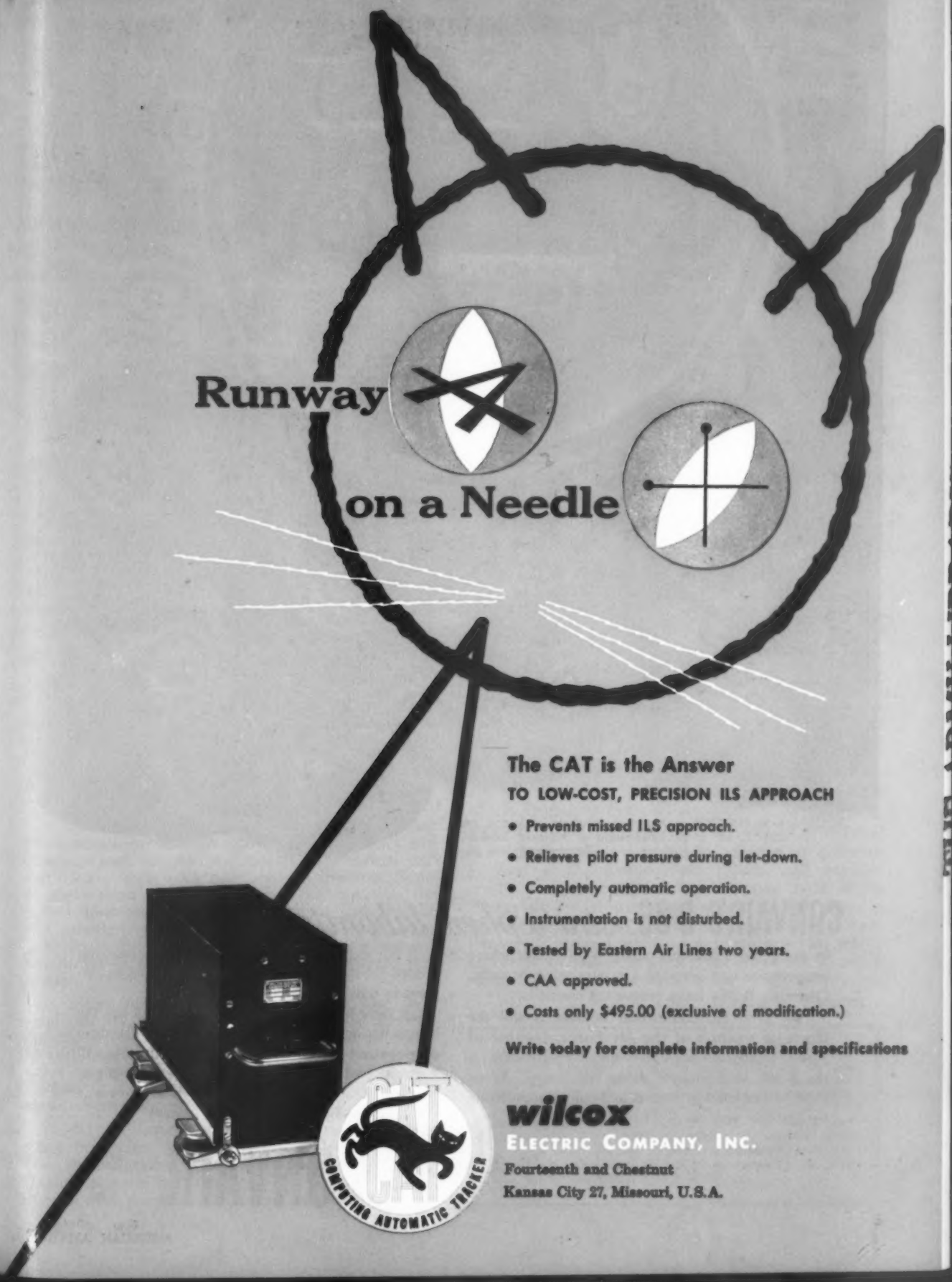
I mention this point because we are definitely not following the trend to replace flying boats with land planes. Our Pacific areas are ideal for the flying boat from the military point of view, and personally I am convinced that the flying boat will once again come into its own.

D. V. CARNEGIE

Chief of Staff
Air Department (C.A.S.)
Wellington
New Zealand

(Continued on page 75)

Runway on a Needle



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Jottings from a Notebook

FROM a quick three-week air survey of Europe from Spain to Sweden come the following observations:

● **IRONY:** The two airlines who most staunchly opposed the present trans-Atlantic air tourist fare and seasonal structure at the last IATA conference have been outselling their Atlantic competition by wide margins, which ought to give the competition considerable food for thought as regards both air transport economies and salesmanship. The two "renegades" are TWA, who has been outselling PAA on tourist flights, and Scandinavian Airlines System, who has been outpacing all of the other European carriers since early spring. TWA and SAS fought and lost, accepted the final decision with reluctance, then went out and sold. There's a moral in this.

by W. W. P.

● **FLOP OR DISAPPOINTMENT?** It all depends on whether you were for or against air tourist service within Europe, but to anyone experienced in transportation the drop in revenues by European carriers this summer should be termed a flop since the whole idea was impractical and ill-conceived to start with. Everybody recognized the need for air coach or air tourist service, but what actually happened was the virtual disappearance of first class air service from all of Europe.

The airlines turned their backs on the very passenger who had been the mainstay of their existence during the past 20 years and went after the so-called mass market, which turned out to be nonexistent to them for the simple reason that the lowest fares that the airlines can offer aren't nearly low enough to reach the masses in Europe.

What has happened this summer is a rather frank admission that the European airlines are still inexperienced in the transportation business and don't know their own missions and markets. Some of them must have thought that Europe was the U.S. where the "masses" actually do have money and relatively greater freedom to travel and do as they please. But in Europe, the "masses" are scarcely able to travel by air at anywhere near current fare levels.

Some airlines also may have felt that they would attract American tourists by low-fare services, but the average American tourist wants to travel by rail, bus, or car in order to see the country, and those Americans who do fly in Europe will fly regardless of cost and prefer comfort and convenience above everything else.

So the European carriers have ended up carrying first class passengers in high-density (and often uncomfortable) tourist services at less revenue. Meantime some of their long-time first class customers went back to the railroads where comfort and service compensated for a longer trip (and who is in much of a hurry in Europe anyway?). Prediction: there will be a scurrying by some airlines back to quality first class service for next year. And none too soon. In the meantime air tourist service should continue commensurate with the market at those fare levels.

● **OVER THE ATLANTIC:** All trans-Atlantic carriers are now looking back longingly and fondly to the year 1952 as the last of its kind for a long, long time, if not forever. Remember the summer of 1952? There wasn't enough equipment to carry the traffic. There were standbys waiting to grab every seat. Not so this year.

Traffic is nicely ahead of 1952, but there's so much equipment available that some flights have actually been consolidated to avoid hauling so many empty seats across the big pond. Space has been available virtually all the time. Nobody's complaining, particularly, but the good old postwar period of seat shortages is over. Period. Now it's scrapping the hard way for bodies to fill the seats.

● **PRESTWICK ENIGMA:** One huge mystery is why the British are neglecting Prestwick Airport, near Glasgow, as a major gateway to the British Isles and to Europe. The neglect amounts to cutting off the nose to spite the face, because British European Airways is being blanked out of a lot of Continental connecting business as a result.

SAS is carrying record loads through Prestwick, but connections to London are incredibly bad this summer (nearest air service to London is 40 miles away at the small Renfrew Airport) and Continental business goes to Copenhagen, which means the British miss all of it. The shabby aviation treatment of the Scots by the English is an internal matter, but air transport is international, and the effort of the English to focus all air attention on the single gateway airport of London is doomed to failure.

Prestwick is an admirable first class gateway to Europe. Stultification, restrictions, and bureaucratic maneuverings by London may hold down Prestwick by arbitrary means, but the real loser is Britain itself, which often seems inclined to forget the very freedoms which once made it a vast world power. If Britain is to be a great air center it needs several gateways and open house to all.

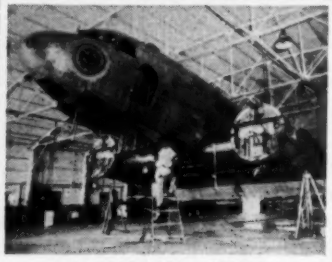
. . . WAYNE W. PARRISH

Correction: Because of a boner by inexperienced vacation substitute help, the final paragraph of the editorial titled "Meeting the Challenge" was mistakenly made the last paragraph of the preceding editorial, "An Air Exchange," in the last (July 20) issue. Thus by this transposition the CAB was excessively (and unintentionally) belabored over a single issue and not sufficiently belabored over the broad air transport challenge now facing it. The mix-up is regretted. . . . WWP

EXECUTIVE AIRCRAFT OVERHAUL

BY

TEMCO



CASE HISTORY: #822-120
CUSTOMER: GOVERNMENT OF ECUADOR
SHIP: DOUGLAS EXECUTIVE TYPE C-47, #506

Comprehensive overhaul of entire airframe including overhaul of propellers; overhaul of all engine accessories and build-up and installation of replacement engines. Overhaul of hydraulic, fuel, defrosting, anti-icing, fire-fighting and electrical systems; landing gear, heating system, brakes and oxygen system. Painting of aircraft, using white solar paint. Overhaul of all instruments, installation of reconditioned radio compass and Collins transmitter. Overhaul of radio, auto-pilot, radio compass and installation of new radio compass. This is the second C-47 rehabilitation job for the Government of Ecuador at TEMCO-Greenville, the first having been delivered in November, 1952.

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Industry Spotlight

Newest U.S. transport on the horizon is a Douglas DC-9, said to be powered by four Pratt & Whitney T34 turboprops. The DC-9 is reportedly an adaptation of the Turbo-Compound-powered DC-7 (now under construction for American, United, Delta-C&S, and National Airlines) except that the wing will need beefing up. Lockheed encountered a similar problem when it tried to make its Navy R7V-1 Super Constellation with Turbo-Compounds into an R7V-2 with T34's.

• •

Cost of the C-124X which Douglas is developing for the Air Force will be $9,866,000 a copy, including about $4 million per plane for amortization of tooling. The newest Globemaster will be a high-wing version powered by four Pratt & Whitney turboprops, probably T34's with 5600 hp each, but possibly propjets developed from the 10,000-pound-thrust J57 turbojet.

• •

When Curtiss-Wright bought licensing rights to the British Armstrong-Siddeley J65 Sapphire turbojet in October, 1950, the Air Force expected a turboprop version, the T47, to develop 10,000 hp. It's unlikely, however, that the T47 on the test stand produces that much as yet.

• •

Bendix Aviation Corp. and the AF's Wright Air Development Center at Dayton are working up two new altimeters to measure altitudes ranging from 25 to 95 miles in the upper atmosphere. One model will operate between 150,000 and 300,000 feet; the other between 300,000 and 500,000 feet.

• •

Consolidated Vultee has been authorized by the Air Force to incorporate titanium in production quantities on the B-36 airframe. The new metal may serve to lighten the intercontinental bomber, possibly enabling it to pick up more speed than the plane's currently rated 435 mph.

• •

International Telephone and Telegraph Corp. has developed a radar simulator for studying air traffic control problems. Known as Navascreen, the device consists of a 144 square foot translucent screen upon which are projected the paths of 13 "planes" operated by 13 "pilots" seated before consoles. Path of each "plane" shows as a dot of light and the screen simultaneously projects the airport area. Navascreen can simulate congested landing conditions and new methods of radar control at fields all over the world.

• •

Aircraft production for both the USAF and NATO nations is scheduled to go from the present 65 a month to a peak of 730 next March. After that output is slated to taper to 500 a month by mid-1955 and 200 a month by mid-1956.

• •

Two of the 16 troop carrier wings in the USAF's interim 120-wing goal are to be transferred to the Air Reserve in 1956 and are to be replaced by fighter-bomber wings. The 120-wing force, therefore, will have 106 combat wings vs. 126 in the 143-wing program.

• •

Transcendental Aircraft Corp., Newcastle, Del., has a USAF contract for a vibration survey on a convertiplane similar to the one being developed by Bell Aircraft at Fort Worth. Transcendental's contract may involve construction of its own convertiplane.

• •

Fairey Aviation is planning to charge $350,000 for its Rotodyne helicopter, which it will market as a DC-3 replacement. The mock-up has been finished and the British Ministry of Supply has ordered one prototype, which is expected to fly sometime in 1955. The Two engines will be 3000 ehp Napier Eland turboprops, which will drive propellers on a short-span wing, as well as a five-bladed single rotor. Forty to 50 passengers will be carried up to 400 miles at 200 mph.

Why GILFILLAN GCA RADAR is unique

Gilfillan GCA Radar is unique because it is the only military equipment that is standard among fifteen air forces in eleven countries:

Only Gilfillan GCA Radar is standard equipment used in twenty-four nations of the free world.

Such unique world-wide acceptance is proof of superiority of this one radar landing system. It is global recognition of the dependability of Gilfillan GCA Radar at 200 bases and airports around the world.

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United States Air Force
United States Marine Corps
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GREAT BRITAIN
British Royal Air Force
British Royal Navy

THE NETHERLANDS
Royal Netherlands Air Force
Royal Netherlands Navy

AND THE AIR FORCES OF:
Australia, Belgium, Canada, Denmark, Italy, Norway, Portugal, Union of South Africa

In GCA and Radar Research, Design and Production, the FIRST name is... *Gilfillan*

Los Angeles

B.F.Goodrich

The weight saved here is still on this airplane

NO MATTER what job the Navy thinks up for Lockheed's Neptune, it always turns out that a lot of equipment has to be taken along. Maybe it's electronic search equipment, and/or a lot of added armament, but whatever it is, it's important. The airplane has been designed through many changes, always stepping up her capacity to carry more useful load.

Some of this weight-saving comes out of landing equipment. From the beginning, this famous series has been equipped with B. F. Goodrich wheels, brakes, tires. One of the weight-saving changes on the BFG brakes is a new kind of brake block. No rivets are used. The lining is cemented onto a light magnesium shoe. And the brakes last longer because more of the lining is used.

Another way the brake was made lighter (and better): The B. F. Goodrich expander tube principle has the basic advantage that braking action applies equal pressure over the full circle of the drum, giving greater braking power, better load distribution. Today's B. F. Goodrich brake has a new, narrow-cavity tube that gives even *more* braking pressure, with *less* fluid, and, of course, *lighter* weight.

Landings on the new brakes are safer, smoother. The brakes respond smoothly and quickly to minimum pressure, take emergency overloads better, cannot lock or grab. There are other advantages. Ventilated shoe dissipates heat more rapidly. Retractor spring action eliminates wear due to drag. Relining can be handled with a screwdriver and wrench.

The B. F. Goodrich wheels on the Neptune are light, strong magnesium castings. Tires are the lightest weight practicable for the loads carried. These developments for greater safety *and* less weight are typical of continuing product improvement at B. F. Goodrich.

Send this coupon if you would like more information about any B. F. Goodrich aeronautical products. Check the items, print your name and address in the margin below (or pin to your company letterhead).

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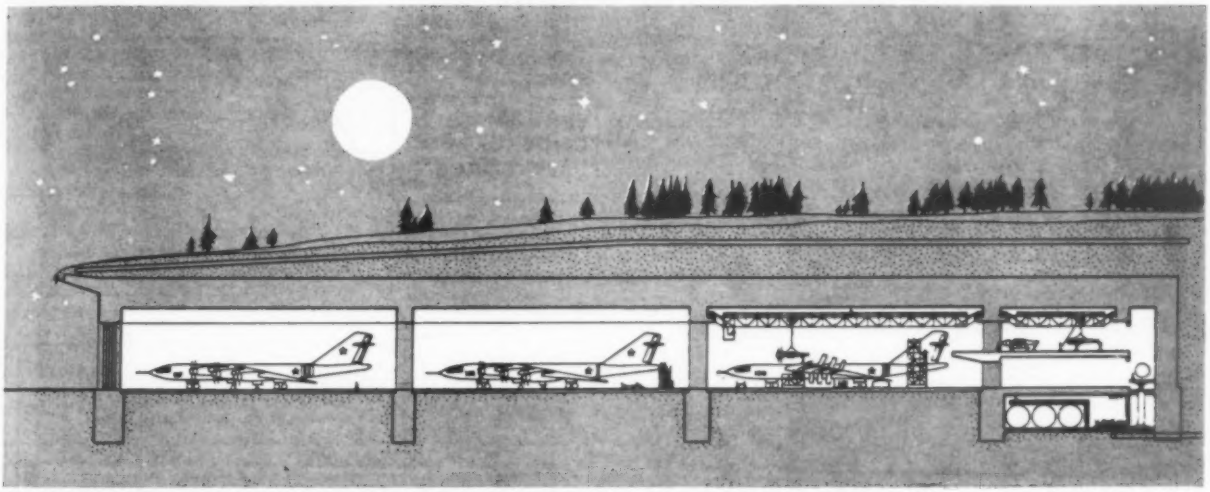
VOLUME 17, NO. 5



TO SAFEGUARD new "America bomber"—the TuG-75 (or Type 31), the most complex aircraft yet built in the Soviet Union—every major bomber base is being equipped with underground hangars with complete maintenance facilities. Early versions of the TuG-75 had turboprops, but the current production model is turbojet powered.

Bomber Output Gets Top Russian Priority

Four hundred six-engine planes to be backed by 1100 four-engine models, underground hangars.

By Anthony Vandyk

THE BUILDING UP of Russia's long-range bomber force is now a top priority item in Soviet defense planning, latest information from behind the Iron Curtain reveals. To safeguard the big new "America bomber" now starting to come off the Russian production lines, a vast program is under way to provide air bases with underground hangars and facilities. All this adds up to a change in Soviet thinking.

Hitherto strategic bombing has had a very small role in Red Air Force planning. Until the end of World War II only one per cent of all planes built in Russia were long-range bombers. Today that figure is up to seven per cent, with every indication of a continuing upward trend: Georgi M. Malenkov, Russia's top man, is known to be a staunch supporter of strategic bombing in defense planning. (He acquired a wide knowledge of the use of air power during his many years' activity as one of Stalin's advisers on air force matters).

Blueprint of the new Soviet Strategic Air Command calls for a force of 400 six-engine "America bombers" in the B-52 performance category, backed by about 1100 four-engine models with performance approximating that of the B-50.

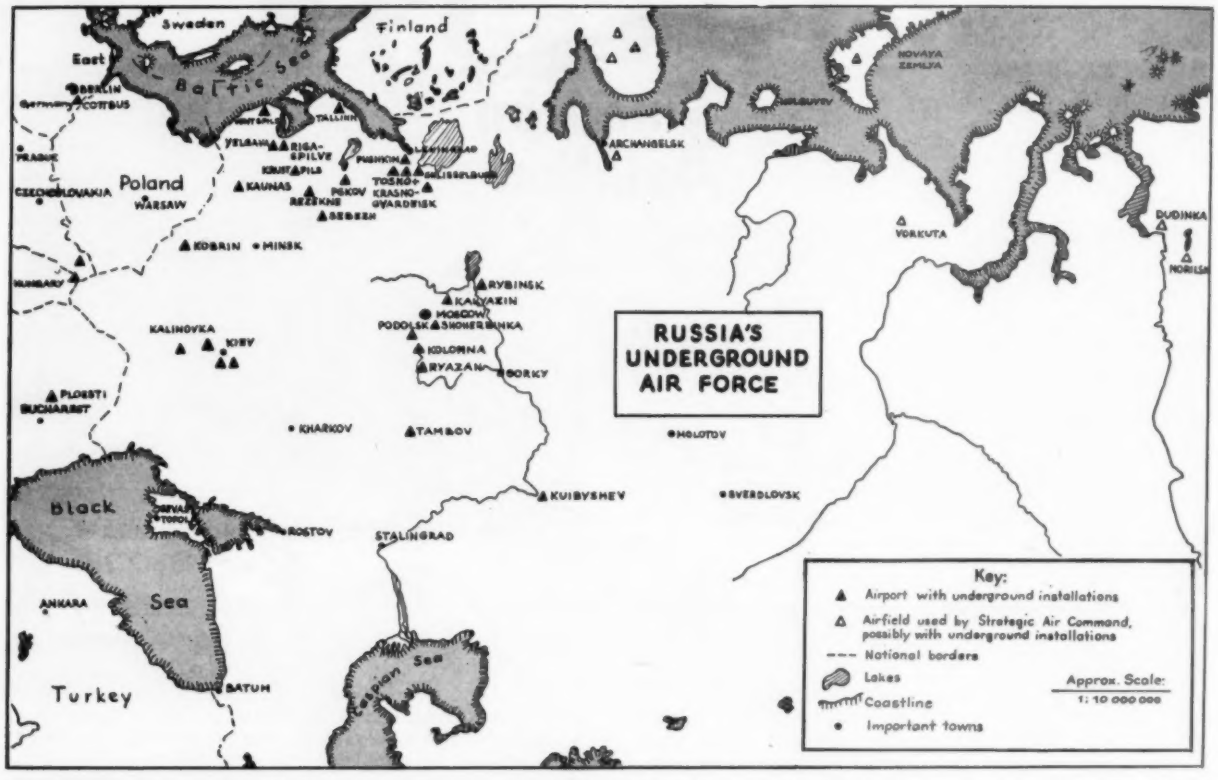
The four-engine fleet, comprising Tupolev Tu-4 bombers, is now virtually complete, although production of these aircraft (including transport versions) is still in full swing (at the rate of 55 to 65 a month). There are indications however, that plants will soon switch most of their resources to the "America bomber"—the TuG-75 (Type 31)—which is now in limited production in the Far East. At least two Red Air Force wings based in the extreme northwest of the Soviet Union are equipped with TuG-75's. The present production version of the TuG-75 has turbojet engines, giving it a cruising speed in the 500 plus mph bracket and a range of 6500 miles.

One of the main centers selected for the mass production of the TuG-75 is Molotov, an industrial town in the Urals which has been developed into one of Russia's biggest arsenals; almost all of Molotov's 300,000 inhabitants work on the production of armaments or in the numerous armed forces' establishments (including Air Force and naval air bases) which ring the town (see map on page 15).

The original aircraft plant at Molotov no longer produces airframes but is entirely devoted to the production of engines (since 1950 it has concentrated on jets); peak production is 500 engines a month. Molotov's aircraft plant proper is located about 14 miles northeast of the town and is one of the largest (if not the largest) aircraft factory in the Soviet Union. A total of 24,000 workers operating day and night in three shifts are engaged in bomber production within the 1½-mile by ¾-mile factory.

The Molotov aircraft plant receives its raw material from relatively close sources. Aluminum, for instance, comes from Kamensk-Uralskiy 240 miles distant; engines for the Tu-4's come from Sverdlovsk, 190 miles away, and from Chelyabinsk, 380 miles distant; rubber equipment is supplied from Gorki. Only item that has to come all the way from Moscow is ballbearings. The Molotov plant manufactures propellers and supplies them to other aircraft factories.

Despite its modern equipment—almost all foreign—and the nearby supply centers, the Molotov aircraft plant is by no means a model of efficiency. As in all Russian factories, there are three "bosses"—the plant manager, the Communist party representative, and the secret police representative. Despite ex-



THE EXTENT of the Red Air Force's "go underground" policy for bomber bases is clearly shown on the above map. At the moment the program to build hangars below ground is still in an early stage. It is estimated that present facilities would not accommodate more than about 120 TuG-75 "American bombers." Planning calls for underground hangars for the entire Russian Strategic Air Command—400 six-engine TuG-75 "America bombers" and 1100 four-engine Tupolev Tu-4's.

treme vigilance and punishment of all suspects, sabotage is a frequent occurrence at the Molotov factory. Scarcely a month goes by without an aircraft crashing on a test flight.

The establishment of U.S. Air Force bases in Alaska and at such strategically located points as Thule in Greenland has caused the Soviet planners to have second thoughts on the "invulnerability" of production centers in and beyond the Urals, such as Molotov.

There is a growing realization that no point in the Soviet Union is outside the range of modern American bombers and that complete security can be achieved only by going underground. As yet there is only slight indication that aircraft plants are being "buried," but it has been clearly established that Red Air Force policy now requires that strategic bombers be kept in underground hangars.

Russia's decision to build underground hangars and facilities at long-range bomber bases stems from the belief that the complexity of the modern bomber requires that it operate from a well-equipped base with permanent facilities and a large technical staff. In time of war there would be no attempt to move the planes to auxiliary landing grounds to prevent them being attacked while on the ground. Instead they will stay at their permanent bases in underground hangars when not actually flying.

Soviet planners admit that there is a danger that enemy attacks may damage the bases' runways while the planes are safe in their hangars but point out that repairing runways is easier than repairing planes. Moreover, the bases will have their own protective fighter units in addition to anti-aircraft artillery.

At the moment the program to provide all bomber bases with underground hangars is still in an early stage and it is estimated that present facilities would not accommodate more than about 120 six-engine planes.

Although ultimately life at Russian bomber bases will be completely underground, the present policy is merely to put the hangars, fuel storage tanks, bomb dumps and ammunition depots below ground. Living and sleeping quarters for personnel are in most cases still above ground, but the program calls for everything ultimately to go underground.

Various types of underground hangars are used at Soviet air bases. The most common type is excavated out of hills on the field's perimeter, but where the country is flat genuine underground facilities are built with their roofs up to 25 feet below ground. Usually in the latter case there is a layer of about three to five feet of reinforced concrete in addition to some 20 feet of earth. Fuel tanks are protected by three feet of concrete and 16 feet of earth.

The underground hangars are usually built in groups of two or three. A typical hangar is 650 feet long, 165 feet wide and 40 feet high. Fuel tanks are usually of about 33,000 gallons capacity and are separated at 300-foot intervals. The number of these tanks varies from base to base.

At the moment the Russian program to build underground hangars mainly involves the Soviet Union itself. There are, however, certain fields in northeast Hungary and in the Ploesti oilfield area of Rumania which are equipped with underground facilities. In Germany underground hangars are being built at several fields.

The following are some of the more important bases already provided with underground facilities:

Pushkin (15 miles south of Leningrad), hangars for an estimated 50 bombers and 70 fighters in the Pushino hills on the perimeter of the field.

Shlisselburg (on Lake Ladoga), underground hangars on the eastern side of the field.

Tosno (40 miles south-east of Leningrad), underground hangars with catapults to get light types of aircraft into the air without taxiing or use of elevators.

Krasnogvardeisk (30 miles southwest of Leningrad), several underground hangars.

Pskov (on the former Russian-Estonian border) two groups of underground hangars with workshops and fuel lines into hangars; underground narrow-gauge railroad.

Tallinn-Lasnamae (Estonia), underground hangars.

Riga-Spilve (Latvia), three groups of underground hangars suitable for light bombers.

Rezekne (Latvia), underground hangars now under construction.

Ventspils (Latvia), two underground hangars about 700 feet long and underground workshops.

Yelgava (Latvia) underground hangars at this new field have a total length of over 1,500 feet.

Krustpils-North (Latvia) Ground-level hangars covered with a thick layer of earth.

Kaunas (Latvia)—two bases. One with underground hangars accommodating 35 four-engine bombers. The other, north of the town, is a new facility with eight large underground hangars.

Podolsk (25 miles south of Moscow), underground hangars, fuel tanks and ammunition depots.

Sebezh-East (on the Latvian border), underground hangars and 15 underground fuel tanks.

Shcherbakov (Rybinsk), factory airfield (jet bombers) and air force bomber base with underground hangars and workshops.

Kalyazin-South (on the right bank of the Volga northeast of Moscow) underground hangars on the south side of the field.

Shoherbinka (12 miles south of Moscow), underground hangars for heavy bombers.

Kolomna (80 miles southeast of Moscow), numerous fuel tanks buried very deep.

Ryazan-Dyagilevo (southeast of Moscow), underground hangars (with catapults) capable of accommodating 100 bombers. Important medium and heavy bomber base.

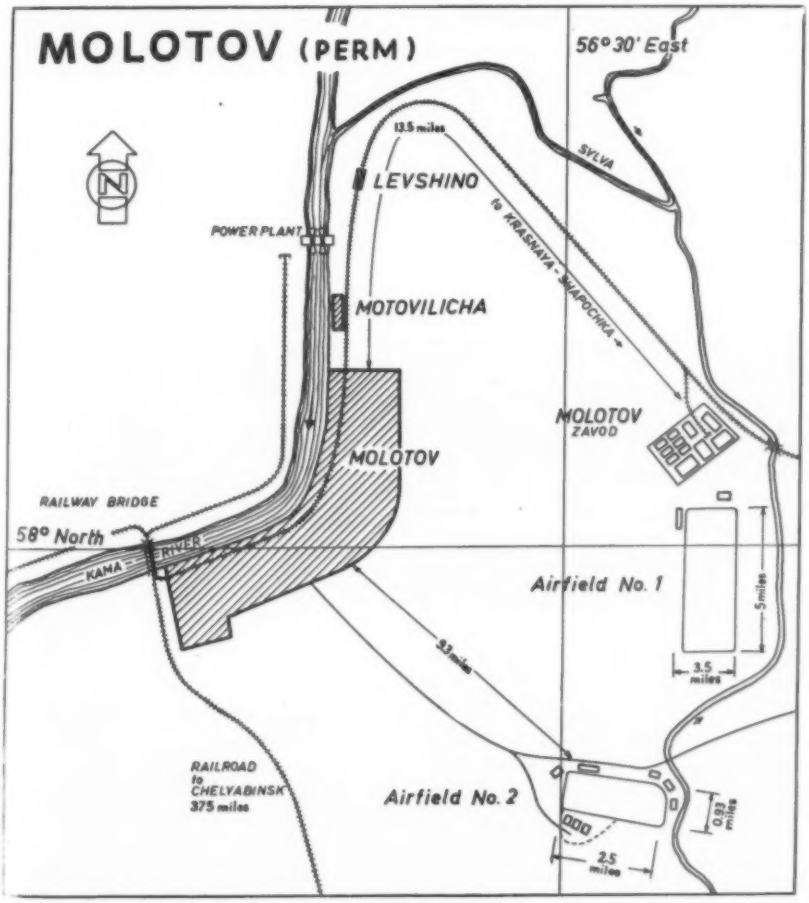
Tambov-East (on the Moscow-Ryazan-Saratov railroad), two groups of underground hangars with a combined capacity of 120 heavy bombers, underground fuel tanks linked by pipe line to a pumping station on the railroad line 2½ miles distant.

Kuibishev-North (at the confluence of the Volga and Samara rivers), believed to be the airfield for an underground aircraft factory in Kuibishev. Underground hangars accommodate 50 fighters.

Kiev-Southwest, underground hangars.

Kiev-Zhitomir, one of several airfields located about 12 miles west of Kiev, has underground hangars.

Kobrin (east of Brest-Litovsk), five large underground hangars with workshops. Heavy bomber base. • • •



LOCATED IN THE HEART OF RUSSIA, Molotov (formerly known as Perm) is one of the chief arsenals of the Soviet Union. Located near Zavod, about 13 miles east of the city, is the Molotov aircraft plant, one of the prime sources of bombers for the Red Air Force. The factory will soon switch from producing the four-engine Tu-4 to the six engine TuG-31 "America bomber"; at the moment TuG-31 production is concentrated in Russia's Far East. A labor force of 24,000 is employed at the Molotov plant.

Details on J65 Licensing Revealed

Armstrong-Siddeley, British engine manufacturer, will receive a fee totaling $499,800 from Curtiss-Wright Corp. for licensing rights to the J65 jet engine, plus $62.50 for each powerplant built by Buick Motor Division, it was revealed in testimony before the Senate Military Appropriations subcommittee.

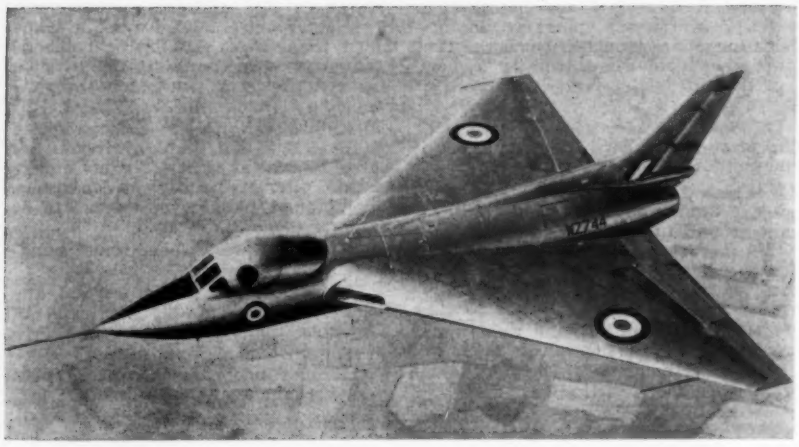
The British have had as much trouble with aluminum blades in the J65 as C-W, according to Col. John L. Zoeckler, Air Force deputy director for aircraft programming. He added that Armstrong-Siddeley also had to redesign the engine to make the first three stages of stainless steel. Testimony revealed that AF has paid C-W $12.3 million on the J65 project.

Questioned about AF cancellation of C-W's T35 turboprop after $26.3 million had been spent and 17 engines delivered, Maj. Gen. M. J. Asensio, AF budget director, told the subcommittee that the project was terminated to save funds "since the Air Force decided to rely on Navy developments in this area and since developments to that time indicated even higher performance engines were required."

C-123B Cancellation Costs Over $115 Million

Complete cancellation of the Chase C-123B program at Kaiser Motors' Willow Run plant will involve contract termination charges of between $115 and $140 million, the Air Force estimates.

The amount of fiscal 1952 funds thus able to be reprogrammed will be between $136 million and $141 million, according to information supplied to the Senate's Military Appropriations subcommittee. Total amount set up for C-123B production by AF was $276,335,000.



Delta-wing trainer, the Avro 707C, has completed a 30-minute first flight at Woodford, England. Powered by a Rolls "Derwent" engine, the plane is a dual version of the Avro delta research 707.

AF to Spend Research Funds Despite Limit

Although Defense Secretary Wilson has ordered one fourth of research and development funds in all three services for fiscal 1954 impounded in a Defense Department "kitty," Air Secretary Talbott believes the Air Force will be able to obligate the entire $475 million appropriated for R&D this year.

Under Wilson's directive, the Air Force is permitted to place research contracts for only $365 million during the year which began July 1. But Talbott thinks the Defense Department's restudy will permit all the money to be spent.

Talbott's special assistant for R&D matters, Trevor Gardner, says he will be satisfied only "if we get all the money back" after the Defense study, but pronounces himself dissatisfied with the time that will be lost while the study is made. Gardner has also gone on record declaring that even the full $475 million is "already not enough in the face of increased research and development demand on the Air Force."

Property Taxes May Hit Work in Progress

New personal property tax assessments, made this year for the first time against work in progress on military aircraft contracts, may cost manufacturers in Los Angeles County $12 million a year. Appeals are being filed with the county board of equalization.

Heretofore, manufacturers have been exempted from the taxes. Now, however, the county legal department is reported to have handed down an opinion that the state courts will uphold the tax assessment because an unfinished airplane hasn't yet become government property and thus untaxable.

Inventories involved are estimated to include approximately $85 million held by airframe companies and $50 million by subcontractors.

The tax could have far-reaching effects. It could result in a substantial increase in the cost of military planes and, if once established in Los Angeles, might spread to all sections of the country where large government contractors are located.

Navy Plans to Convert 96 More R4D's

Complete conversion of 48 R4D's (DC-3's) to R4D-8's and provision of all parts to modernize 48 more will be possible with the $28,043,000 requested from Congress by the Navy, Adm. T. S. Combs, former chief of the Bureau of Aeronautics, has told a Senate committee.

He said 98 R4D's have been modernized in the past and the additional 96 will put the Navy about two-thirds of the way toward its goal of converting 300. Program involves change to Wright R1820-80 engines and complete overhaul installation of new wing panels. Payload is increased 50% and speed by 40-50 mph.

Martin B-57 Flies

Air Force's B-57 night fighter, built by The Glenn L. Martin Co., made its initial flight July 20. Plane was developed from the basic design of the English Electric Canberra. The flight, with O. E. ("Pat") Tibbs, Martin's director of flight tests, at the controls, was the standard preliminary to official AF first flight acceptance test, which was scheduled for July 30.

American Proposes Plan For First-Class Mail

Following failure of domestic airlines to agree on proposed rates for carriage of first-class mail by air, American Airlines on July 21 submitted its own plan to the Post Office Department: 25¢ a ton-mile for all such New York-Los Angeles mail on a one-year test basis, over and above the tonnage AA now carries.

Some other airlines, chiefly TWA and Northwest, were still hoping there would be industry agreement on rates. Capital Airlines and the local service lines, however, indicated they will file their own proposals with the PO. National had already offered to carry first-class mail under its freight tariff. United and Eastern had not yet stated a position.

With the PO asserting that it wanted to start first-class mail experiments within the next two months, airlines had held several meetings on rates, but called off the sessions after failing to agree.

AA proposes to carry first-class mail on transcontinental flights stopping at Chicago or Dallas-Ft. Worth, and will also be willing to handle such mail to these points at a somewhat higher rate. Mail will probably also be carried on DC-6A freighters in a day-end "mop-up" operation, C. R. Smith, AA president, said. A priority higher than freight but lower than express will be given first-class mail.

AA said its 25¢ proposal is for "tonnage in addition to that now being transported." This means that if the carrier's air mail volume falls off, it will expect to receive 45¢ a ton-mile (present mail pay rate) for sufficient first-class mail to keep the New York-Los Angeles tonnage figure up to where it is now.

Ralph S. Damon, TWA president, and James Mariner, NWA's vice president-sales, both stated they believed industry agreement could be reached on rates if the PO will furnish answers to a number of questions. Chief among these are what route segments will be used in experiments, what the estimated volume of first-class mail will be, and what priority this mail is expected to receive. Damon said he favors another airline-PO meeting.

P&W Releases Specs On PT2F-1 Turboprop

The Pratt & Whitney PT2F-1 turboprop engine, commercial version of military T-34 recently made available for civil use in U.S. and abroad, will have a dry weight of 2564 pounds and a sea level take-off rating of 5600 equivalent shaft horsepower, according to specifications released by P&W.

Guaranteed calibration stand performance for the PT2F-1 engine under sea level, static output, NACA standard conditions, listed by P&W for the engine, is:

	*Equivalent Shaft HP	Shaft HP	Engine RPM
Take-off power	5600	5100	11000
Normal rated power	4850	4400	10750
Cruise—			
85% rated ..	4145	3740	10570
60% rated ..	2990	2640	10250

** Equivalent Shaft Horsepower assumes 2.5 lbs. static thrust equals 1 SHP.*

Engine will have a maximum diameter of 34.06" and a maximum length of 157.4", both at room temperature. Maximum oil consumption at take-off and at normal rated power and speed is five pounds/hour. Dry weight of 2564 pounds does not include such standard equipment as engine mount structure (49 pounds), engine brake and actuator (26 pounds), and compressor overboard bleed manifolds (seven pounds).

Off the assembly line at Convair's San Diego division comes the first T-29D bombardier trainer for the USAF. The aircraft provides stations for seven students and instructors.

Britain to Dismantle Bristol Brabazons

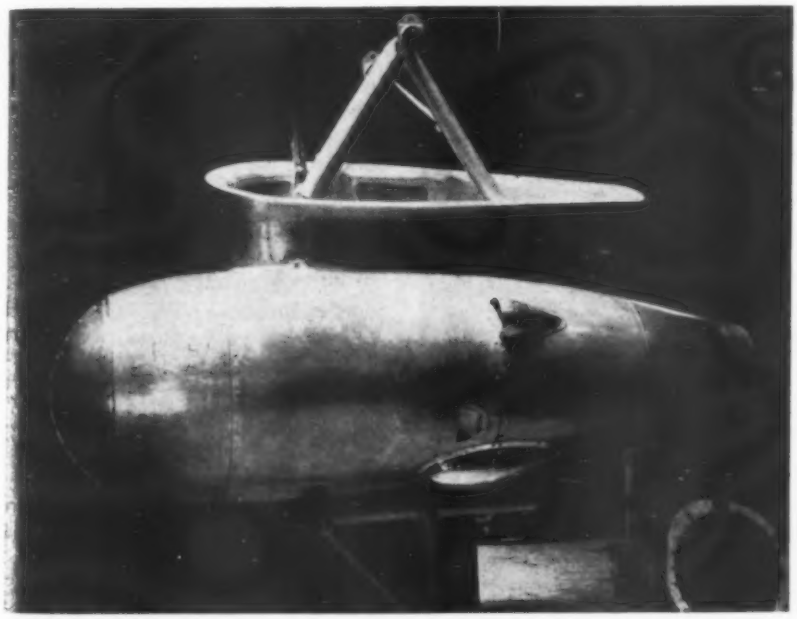
Britain's two eight-engine, 290,000 pound Bristol Brabazons are to be dismantled. The project, which has cost $33.6 million to date, will be abandoned on economy grounds, the British government has announced.

The Brabazon I, with Bristol Centaurus engines, has not flown since last fall and is said to have logged only about 100 hours since its first flight in 1949. The Mark II, which was to have had Proteus turboprops, is only partly completed.

Engine Switch on F-84F Discussed

Air Force officials are again talking about replacing the Curtiss-Wright J65 engine in the Republic swept-wing F-84F with another power plant, probably the 9-000-pound-thrust General Electric J73. If this should occur, it would mean another redesign of the Thunderstreak fighter-bomber.

The Air Force, especially during the past when Sapphire deliveries from Curtiss-Wright had been slow, had considered using alternate engines and had sponsored talks between G.E. and Republic on possible use of the J73. AF officials said officially they knew of no plans to make such a switch at present.



Flight testing will start soon on El Al Israel Airlines' C-46 with two Turbomeca Marbore II booster jet engines of type shown above. El Al plans fleetwide installation of jets, said to provide C-46 take-off performance at 50,000 pounds equal to that of present C-46 at 40,000 pounds.

Aviation Subcommittee Set Up in Senate

A three-man aviation subcommittee of the Senate Commerce Committee, which is to function as a study group, has been established by Sen. Charles W. Tobey (R., N.H.), committee chairman. Group consists of Sens. John Sherman Cooper (R., Ky.), chairman, Dwight Griswold (R., Neb.), and Edwin C. Johnson (D., Colo.).

Tobey said the subcommittee will try to define the "public interest" in aviation, and will review the present statutes to "determine how well they are protecting and promoting the public interest under present-day conditions."

Suggesting a "case-study" method, he said the non-sked problem, for example, might be approached by considering whether the public benefits most by strict regulation of entry into the air carrier field, or by a freer method of licensing new service.

CONVAIR TURBOLINER, powered by Allison T38's, has over 216 hours in the air.

Next Transport: Turboprop or Jet?

Military program will put several turboprop transports into the air in the near future.

By FRED S. HUNTER

IF YOU ENJOY peering into crystal balls, you can have yourself an interesting session picking out signs seeming to indicate that the turboprop may beat out the turbojet in the race to power the U.S. replacement transport airplane (or airplanes).

A good many of the recent signs point in that direction. One in particular is the fact that the military air transport program, which continues to bypass the turbojet, calls for several turboprop samples to be flying in the very near future. These include turboprop versions of the Douglas C-124, the Lockheed Super Constellation, the Boeing C-97, and the Convair 340.

There also are some minus signs. You can't get much encouragement from the record of service time accumulated by the turboprop aircraft produced in this country so far. Take a look at the record as of a recent date:

Aircraft	Engine	Total Hours
Convair Turboliner (240)	Allison T38	216
Convair XP5Y-1	Allison T40	88½
Convair XP-81	G. E. TG100	34
Douglas XA2D	Allison T40	54
North Amer. XA2J	Allison T40	28¼

It will be easier to measure just how effective a shot in the arm P & W's recently launched campaign on its PT2F-1 (commercial version of the T34) will give the turboprop transport after the military models powered by the T34 begin showing what they can do. At least one of these planes, the Douglas C-124B, is scheduled to fly this year—in November. A Lockheed Super Constellation may be ready in December.

P & W is busily at work selling the PT2F-1 following the Navy's recent action releasing the engine for commercial sale (both domestic and export) at a top rating of 5600 hp. Price of the engine has been reduced from the original tentative quotation of $175,000 to $125,000. Some cost analysts count this somewhat expensive. Others say it is not too much to pay for 5600 hp.

It is higher than the price the same company may be expected to put on its eventual commercial version of the J57 turbojet when it is released. But that's because the PT2F-1 won't have the same production cost advantages as will accrue to the J57 from the latter's huge military volume for combat planes.

Prop and Engine: $150,000

Propeller costs haven't been finalized, but they are being estimated at $25,000 per prop. Thus the cost of a four-engine turboprop installation, including propellers, will come out to be around $600,000 per airplane. It is a foregone conclusion that design engineers—and their airline customers—are going to be pretty sure the power is just what they want before they mark costs like that down on their specification sheets.

P & W's PT2F-1 project takes on added significance because of its early release by the Navy. This is in sharp contrast to the policies which governed the last engine to be released for commercial use and export, the Turbo-Compound version of the Wright R-3350.

This engine wasn't released for export by the Navy until after it had undergone two years of military use (in the Lockheed P2V). It was still restricted for security when it was given its CAA type certificate. The PT2F-1 was released before operation in any military plane.

It has been gossiped about in Los Angeles that TWA tried to place an order with Lockheed for Model 1249B turboprop Super Constellations, but that the manufacturer refused to accept the order until it knew more about the T34 engines through actual flight experience.

This is not true, although Lockheed admittedly is more or less mark-

A Boat Goes Down

Convair recently lost its XP5Y-1 flying boat when the craft plunged into the ocean off San Diego after the flight test crew had bailed out safely. Ironically, a structural failure in the controls, not engine trouble, was responsible for the accident. Convair has another XP5Y, which was completed months ago except for the installation of the T40 engines. These are still to be delivered from Allison. The first XP5Y-1 made its first flight in the spring of 1950. All of the testing during the ensuing three years was done with the original set of experimental engines.

ing time on any further Model 1249 promotion until it has had the opportunity to observe operation of the T34's it is installing in two Super Constellations for the Navy and two for the Air Force. Lockheed is scheduled to get a set of the engines for its first Navy R7V-2 this fall.

Turboprop power for the Super Constellation originally was projected by Lockheed in keeping with a design philosophy that a completely new transport should have turbojet power while the turboprop should be applied to continue performance growth in present planes. This philosophy no longer applies. Lockheed has the new C-130, which it feels may one day make a very good turboprop cargo plane.

More recently it also has even given consideration to a new turboprop craft for its replacement transport instead of a turbojet.

C. R. Smith's announcement that American Airlines favors the propeller-turbine as the next step in air transport progress is undoubtedly a major contributing factor to this new viewpoint, which in turn is one of the reasons Lockheed's L-193 jet transport still hasn't emerged from the design stage.

Other Factors

There are other factors, however. The fact that Douglas has been making studies of a turboprop DC-9—or it might turn out to have a DC-8 series designation like DC-8B—is not the only reason the firm hasn't yet released its jet DC-8 design to the shop, an action everybody expected six months ago. Costs, market limitations, engine guarantees, noise, and competition (both U.S. and British) all are factors.

Not the least of these is that all three of the projected U.S. jets, Boeing's Model 707, the Douglas DC-8, and Lockheed's L-193, are so nearly the same size (80 to 100 passengers) and type of airplane, and all are projected for a market that right now, except for Pan American, exhibits few signs of interest.

At El Segundo Douglas is running three or four years behind schedule on its A2D because of trouble with the turboprop T40 engine. The record is better at Long Beach where the C-124B is a little less than a year behind schedule waiting for the T34 engines.

The C-124B is not intended to be a production plane. It is to serve as a flying test bed for the turboprop engines in preparation for subsequent production of a new, improved turboprop transport which Douglas has referred to as the C-124X, but which will be given a new number by the Air Force.

At the same time that the Navy negotiated the agreement with Lockheed for two R7V-2's, Douglas rejected a similar agreement for two T34-powered R6D's, because it felt the share of development costs it would have had to assume made the project uneconomical for the company.

Although the two Lockheed R7V-2's have been announced and the additional two Air Force Super Constellations have been informally revealed, the fact that Boeing has a contract for two T34-powered C-97's and Convair for two turboprop Convair 340's has not previously been generally known.

Along about the time Douglas is taking to the air with the C-124B, Convair should have another of its turboprops, the R3Y flying boat, on the wing. It's due to receive a set of production T40 engines in the next few weeks.

Despite the fact that its experimental turboprop experiences have been disappointing, Convair has remained unwavering in its faith in the propeller-turbine arrangement as a source of power for transport-type aircraft. Its R3Y, however, is more than a turboprop guinea pig; it represents a new concept of the flying boat.

Viewed strictly from the engineering standpoint, the turboprop's place hasn't been changed by the recent developments. It still is far behind the turbojet, as evidenced by its meager record of service time. The turbojet is accumulating thousands of hours in military combat craft and keeps progressing constantly in performance and reliability.

Lockheed says it can deliver a Model 1249B Super Constellation with PT2F-1 engines in 1957. That would allow three and one half to four years for P & W to develop the engine. Whether this elapsed time may be shortened by T34 developments in the new military transports will be a question to watch with interest. • • •

News Briefs

A total of **718 CAA employes** has been dropped to date in the reorganization. Included are 129 in Washington and about 500 laid off through consolidation of field offices.

• •

John S. Anderson, president of Aeronautical Radio Inc., has been named **vice chairman of the Radio Technical Commission for Aeronautics,** replacing Charles F. Horne, resigned.

• •

New speed record of 715.697 mph was set July 16 at Salton Sea, Calif., by Lt. Col. William F. Barns in a North American F-86D. This was 17.192 mph over the mark set last Nov. 19 by another F-86D.

• •

Rear Adm. Clarence E. Exstrom has taken over as Navy Bureau of Aeronautics assistant chief for materiel, and services, succeeding Rear Adm. J. B. Moss.

• •

Mrs. Geraldine Mickelsen, Sacramento, Calif., school teacher, was elected international president of the Ninety-Nines Inc.

• •

Pan American World Airways was to take delivery in late July of first of **27 more DC-6B's,** supplementing the 18 delivered last year. Deliveries will average two a month through June, 1954. Company also has three DC-6A freighters on order.

• •

The Flying Tiger Line has received $2.5 million Air Force **contract for maintenance on about 100 C-46's.** Work will be performed at Tigers' principal maintenance base at Burbank, Calif. Contract is effective for more than a year.

• •

Channel wing aircraft, designed by Willard R. Custer, Hagerstown, Md., made its first test flights at Oxnard, Calif. Twin-engined plane, a channel-wing version of the Baumann Brigadier, became airborne at 40 mph after moving about 250 ft.

• •

Domestic scheduled trunk airlines revenue passenger-miles were up 23.6% in first five months of 1953 over the same 1952 period, while **international lines** showed a 16.7% gain, Air Transport Association said. Totals are not available for local service lines, but indications are that they are maintaining the 22% rate of growth in passenger-miles shown in the first quarter of 1953, it added.

• •

Pan American World Airways sold **three Lockheed L-49 Constellations** to Compania Cubana de Aviacion. First plane has been delivered and is flying Cuba-Europe. Other two will be delivered in the fall.

• •

Allegheny Airlines bought two more DC-3's, one from Hawaiian Airlines and the other from Southwest Airways. Fleet now totals 14.

ALMOST IN POSITION, the rotary bomb door exposes the bomb load and seals off the bomb bay of the Martin XB-51.

New Door Speeds Jet Bombing Runs

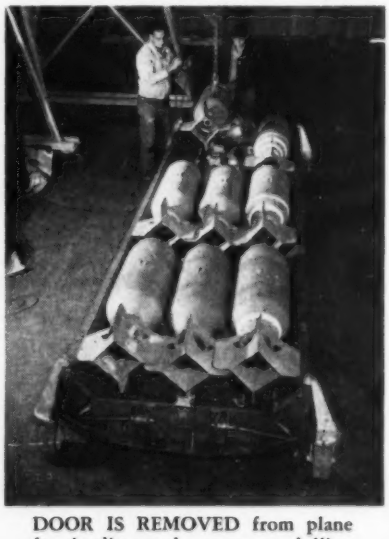
A NEW METHOD of releasing bombs, one that eliminates an open bomb bay and the resultant buffeting, has been conceived and developed by two engineers at the Glenn L. Martin Co. The mechanism consists of a rotary "door" from which bombs and rockets have been successfully launched at high speeds.

The door is loaded with armament before being placed aboard the bomber with bombs facing upward. Just prior to bomb release, the door rotates 180° and the bombs swing outside the bomb bay and face downward.

Through use of this door, one of the few advances made in methods of releasing bombs since World War II, a jet bomber traveling at high speeds is just as stable a platform as one flying at half the speed. It will now not be necessary to slow down to make successful bomb or rocket releases.

The Air Force's Air Research and Development Command and the Martin firm, both at Baltimore, Md., revealed recently that patent number 2,634,656 had been granted to the two Martin armament engineers who invented the door, Werner Buchal and Albert T. Woollens. The patent has been assigned to Martin. The door was developed as a part of the Martin XB-51 three-jet tactical bomber, and all tests have been conducted on that model, but there is some speculation that it may be used on the Martin version of the English Electric Canberra.

Because the door turns over rapidly just before bombs are to be released, there is little effect on the airplane's speed, trim, and stability characteristics. Except for the brief time involved as the door turns, there is no opening in the fuselage and therefore no buffeting.



DOOR IS REMOVED from plane for loading and moves on dollies.

Another innovation of the rotary bomb bay door is a method of preventing bombs from "tumbling" when they leave the plane. This is accomplished by having each bomb or cluster "kicked out" of its shackle by two air-actuated plungers, which get the bombs away from the airplane's airstream in a normal dropping position.

Two types of bomb doors are used. On one, all sizes of bombs except the very largest are carried. The second type is for extremely large bombs and bulges out the bottom of the fuselage.

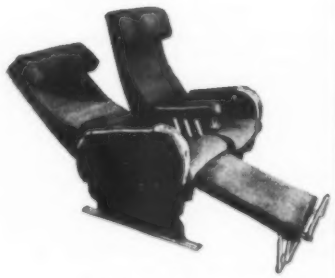
The door when removed from the airplane is mounted on wheels, loaded, chocked, and fused. It is then wheeled beneath the plane and hoisted into position by use of three standard bomb hoists.

On the larger sizes of bombs the load may be split, carrying two on the bottom of the door as external stores at the start of the flight. After these have been dropped, the door is revolved so the bombs which have been carried internally can also be released. • • •

PASSENGER COMFORT ASSURES REPEAT TRAFFIC

Photograph courtesy of
Pan-American World Airways

They rode all night on an AEROTHERM Seat



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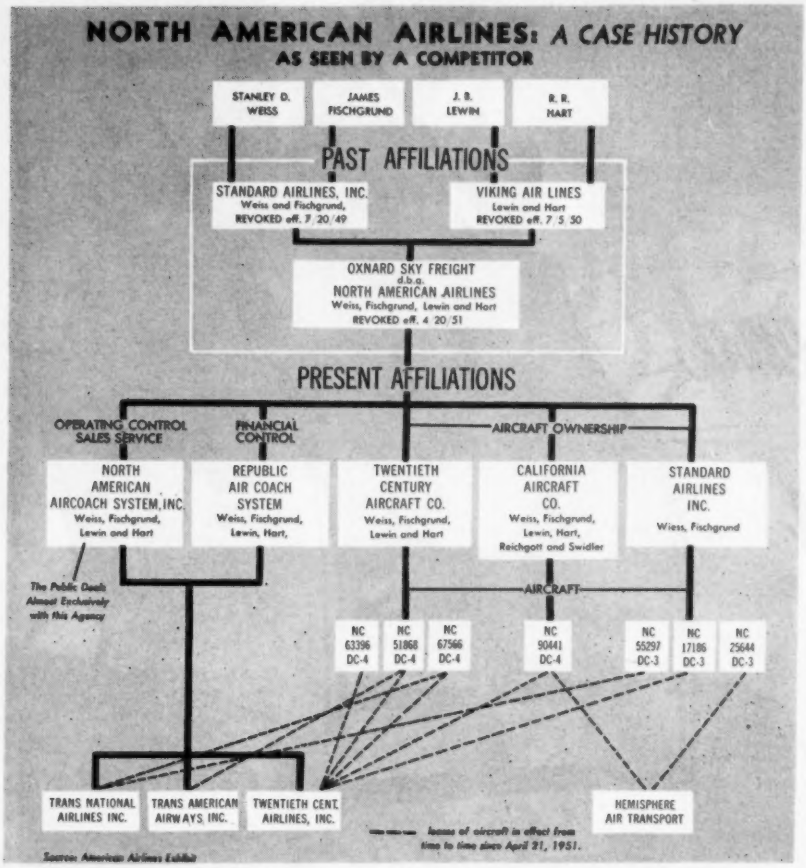

WHEN NORTH AMERICAN makes its bid for broader operating authority at CAB hearings in Los Angeles this month, the above chart will be used by American Airlines in an opposition move.

Non-Sked Fight Flares Up Again

Both Congress and the courts are scenes of hot and heavy attacks on question of irregulars.

By WILLIAM V. HENZEY

THE non-scheduled airline controversy, relatively quiet for the past two years, has exploded in recent weeks under the impetus of North American Airlines' drive to avoid CAB enforcement hearings. Civil courts on both coasts and both chambers of Congress have virtually resounded with renewed cries that CAB is, in effect, strangling new aviation enterprises by regulation.

The situation has become so critical that a plan is under way in some Congressional circles to by-pass CAB's current Large Irregular Air Carrier Investigation, now two years old, and enforce a plan to certificate "three or four" of the "more successful" non-scheduled lines, while at the same time closing the door permanently on non-scheduled lines in the future.

First formal indication of such a plan may come out of a soon-to-be-released report of the Senate Small Business Committee, which recently held hearings on the overall problem.

Another plan, not generally known, but being advocated by former Florida Senator Claude Pepper, now general counsel for the Aircoach Transport Association, is for CAB to take the omnibus investigation out of the hands of its examiners and decide, on the basis of the 18,000-page record now amassed, in favor of authorizing ACTA to sell tickets at cities throughout the country for member carriers, with each member being given a route (by ACTA) over which to operate 15 roundtrips per month.

Currently, there are between 50 and 60 so-called large irregular carriers holding CAB letters of registration.

It is the minority group, however, spearheaded by the North American "Combine," which has stirred up once again a problem which has plagued CAB over the past six years.

On the theory, that CAB's enforcement of its regulations is driving them out of business, these carriers have been successful in soliciting the aid of various Senators and Representatives in the battle against CAB policy.

Senator John J. Sparkman (D., Ala.) former head of the Small Business Committee, and an out-spoken opponent for years of CAB's policy, called for a "review" of CAB's actions recently, claiming "these nonsubsidized independents have already taught the older, grandfather companies how to run an airline without refueling from the Public Treasury." He viewed North American as a "successful and more efficient" carrier.

"Model Operator"

Senator Hennings (D., Mo.) joined Sparkman's remarks and asked Congress to investigate CAB's administration of the Act. Senator Langer (R., N.D.) expressed similar views and Senator Morse (I., Ore.), in a lengthy blast at the Board, saw North American as "the model independent operator in the country."

Who is this "model operator?" It is a group of four non-scheduled airlines and affiliated companies banded together under the North American banner. As a combined unit, it totalled 1952 revenues of $8.7 million; it currently is averaging $700,000 in revenue per month.

In CAB records, none of the carriers involved is actually named "North American." Their official CAB names (those in which their letters of registration are issued) are Twentieth Century Airlines, Trans National Airlines, Trans American Airways, and Hemisphere Air Transport.

Principals in running the organization are Stanley D. Weiss, James Fischgrund, J. B. Lewin, and R. R. Hart. The first two, Weiss and Fischgrund, originally were connected with a nonscheduled line known as Standard Airlines, Inc. It had its license revoked July 20, 1949, for "willful and knowing" violations of the Federal Statute.

So serious did CAB consider the matter at that time that it asked the Department of Justice to institute criminal proceedings against Standard for "bold, flagrant and persistent disregard" of the Act.

Lewin and Hart, meanwhile, were associated with a carrier known as Viking Air Lines. Viking's letter was revoked July 5, 1950, for "knowing and willful" violations of the law.

Soon thereafter, a little-known company, "Oxnard Sky Freight," became the

predominant transcontinental non-scheduled carrier. It did business as "North American Airlines." Principals were—Weiss, Fischgrund, Lewin, and Hart. On April 20, 1951, this company lost its license for repeated violations of the Act and CAB's economic regulations.

The order of the day was for a "revoked" carrier to "pick up" a letter of registration not being actively utilized at the time and resume operations under the new name, or as it once was put, saddling a new horse when the first one played out.

As stated in an American Airlines exhibit now on file at CAB, "None of these revocations cost them a day's business; they simply switched to other operating carriers."

That is the background of the present "North American Combine." Here is how its present method of operation is defined in that same exhibit at CAB:

"The irregular air carriers Twentieth Century, Trans National and Trans American are now used to maintain a pattern of operations similar to that for which the Viking, Standard, and Oxnard letters of registration were revoked. None of these carriers has significant assets, owns any aircraft, maintains a traffic and sales organization, plans its own operations or even does its own bookkeeping. The carrier's name is seldom known to its passengers.

"The operations of the carriers are controlled through the North American and Republic 'Aircoach Systems.' The profits are garnered by Messrs. Weiss, Fischgrund, Lewin, and Hart, although they do not appear of record as officers, directors, employees or holders of financial interests in any of the authorized carriers."

This group now admits to profits of over one million dollars a year. It has secured as a director former Senator Joseph C. O'Mahoney (D., Wyo.) with obvious influence on Capitol Hill. It has retained as counsel Washington attorney Hardy K. Maclay, an expert at tying CAB in legal knots.

With O'Mahoney, it has succeeded in stimulating Congressional criticism of CAB to the point of a wide-open investigation. With Maclay, it has CAB's attempt at proceeding with enforcement hearings bottled up in the Federal Court in Washington.

Its battle cry to combat present charges is, in effect, that there is room for newcomers in the air, that CAB's policy lends itself toward a monopolistic industry. The O'Mahoney-inspired statements of Senators Sparkman, Hennings, Langer, and Morse aren't that polite. Yet, the end result of the campaign could be fewer large irregulars than perhaps would be authorized if CAB is permitted to conclude its present omnibus case or if the Board had never been forced to start it by the Sparkman Committee two years ago.

At that time CAB's policy was one in which individual exemptions were granted to large irregulars which had complied with the law. Fourteen carriers had been granted such exemptions. At least 10 more were certain to be so licensed. Thus, at least six times as many "new enterprises" or "small businesses" would have been licensed if that procedure had not been disturbed, than are contemplated in the current Congressional plan of certificating "three or four" and closing the door on the rest.

That North American today is the biggest and best-equipped (financially) to do battle with CAB is indisputable. That it would be one of the "three or four" to get certificates under the new Congressional plan is certain. Perhaps because of this, the O'Mahoney campaign for "more room for newcomers," and the resulting Sparkman and Langer and Morse cries of "monopoly" seem to lack effective sincerity.

North American may survive, but the outlook is bleak for the bulk of the non-scheduled industry, particularly the real "small businesses" in it. • • •

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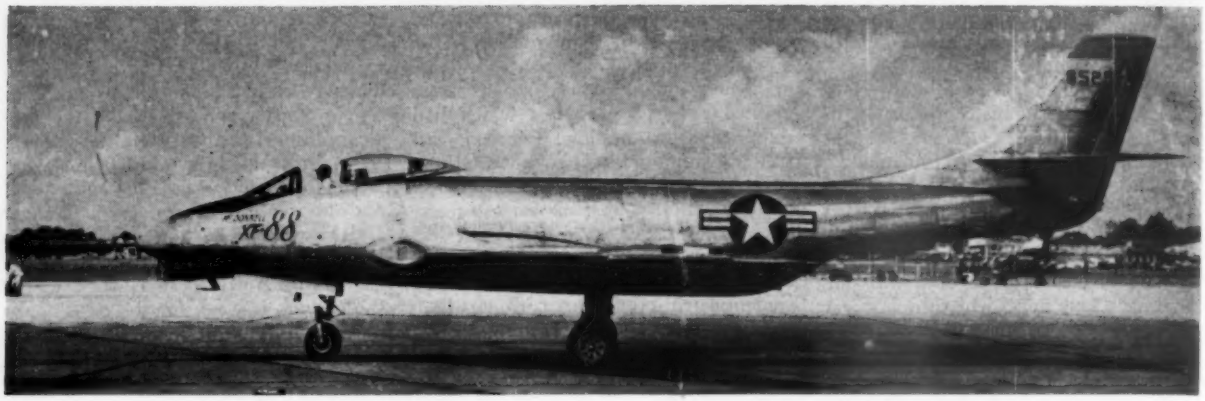

McDONNELL XF-88, twin-jet fighter shown above, was the design from which the F-101 has grown.

100 Series: First U. S. Supersonic Fighters

F-100, first of new group to fly, exceeds expectations during tests; others in group to fly faster.

By HARRY S. BAER, JR.

UNITED STATES air power has a big stake in its fighter aircraft that make up what is known as the "100" series, for the planes with the triple-figure designations have launched the Air Force into a developmental era strictly supersonic. They include the North American F-100, McDonnell F-101, Convair F-102, Republic F-103, Lockheed F-104, and Republic F-105.

During the next few years these aircraft—designed with sweepback, delta-shape, and radically different aerodynamic configurations—will be developed with very little public fanfare since their vital importance to this nation's defense demands complete security precautions. The Air Force will take them over for flight testing as soon as they come off the production lines, assigning its most experienced test pilots to work out the "bugs." A new type of flying will evolve, one in which 700-mph jet speeds may no longer seem so speedy.

Well along on its test flight schedule is the F-100, a sweptwing fighter powered by a Pratt & Whitney J57 turbojet of 10,000 pounds thrust. It went through its initial flight test on June 1 at Air Force Flight Test Center, Edwards AFB, Calif. George Welch, test pilot for North American Aviation, Inc., made two flights on the first day's tests, indicating the F-100 must have measured up to what was expected of it right from the beginning.

"The F-100 is the best I've wrung out in 13 years of flying," Welch commented. "Usually we just get the feel of any new plane on the first hop, but we really put this one through the wringer. It does everything we hoped."

In 1947 Welch test-piloted the North American F-86 Sabrejet, which the F-100 will eventually replace. The F-100, originally designated the Sabre 45, is about 1½-times as large as the F-86. Its wings sweep back at 45° angles, compared to the Sabrejet's at 35°. The J57 engine is reportedly augmented by an afterburner.

NORTH AMERICAN'S F-100: "The best . . . in 13 years of flying." At right, artist's conception.

At Edwards the F-100 was said to have attained level flight speeds of about Mach 1.08 during more than 30 hours of flight testing over the California desert. Lt. Cols. Pete Everest (second man to fly through the sonic barrier) and Dick Johnson (former holder of the world speed record in an F-86), test center pilots, have also flown the F-100, according to reports.

Range: 300 to 1000

The F-100, for which there is a production contract, has the lowest speed of the "100" group. Combat range of most of the series runs from 300 to 1000 miles, according to reports, despite the use of external fuel tanks for all-out range.

One of the most encouraging aspects of the F-100 tests was engine performance. Sources indicate that in some 30 flights the J57 turbojet required virtually no attention. This is promising since this powerplant will be used not only in the F-100 but also the F-101, F-102, and possibly some of the others.

Also possessor of a production contract is the F-101; it is likely that only one other plane in the series will be a production model.

The F-101, a twin turbojet, long-range fighter designed to attack distant targets and to escort bombers, is being produced by McDonnell Aircraft Corp. It is an advanced version of the McDonnell XF-88 Voodoo, a sweptwing fighter operating for the past two years. The XF-88B has been used recently with success by the Air Force as a flight test bed for supersonic propellers, according to General Edwin W. Rawlings, commanding general of the Air Materiel Command.

A reconnaissance version of the F-101, the RF-101, is also in production at the St. Louis aircraft plant.

Consolidated Vultee Aircraft Corp. at San Diego, Calif., is producing the F-102, a delta-wing supersonic interceptor designed for extremely high speeds in the stratosphere. Incorporating significant improvements in electronics and armament, the F-102 resembles and is a successor to Convair's XF-92A, the first delta-wing airplane produced in the United States.

Two Deltas

The triangular-shaped fighter, like the "92," has no horizontal tail, but is equipped with a vertical fin and rudder. It has "elevons" on the wing's trailing edge instead of aileron and elevator controls. Early this year, Col. Royal B. Baker, Korean jet ace with 12 MiG-15's to his credit, was assigned as project pilot on the F-102.

Little information has been released on the F-103, a delta-wing interceptor being developed by Republic Aviation Corp., Farmingdale, L. I. It has been reported that this fighter is scheduled to appear as a prototype by 1955. Titanium, the newly developed lightweight metal with high durability in airframe construction, is expected to be used in a major portion of the F-103.

Lightweight F-104

A forerunner of the development of stripped-down, lightweight fighters is the F-104, designed by Lockheed Aircraft Corp. Its construction calls for a straight, very-thin-wing configuration, short in span, reportedly 28 feet. The fighter, said to be powered by a new Wright turbojet (presumably the J67 Olympus), should be flying early next year, possibly in March. Reports from Burbank, Calif., sources have indicated the F-104 will attain speeds as high as 1500 mph, although these have never been confirmed or denied by either the Air Force or Lockheed.

Republic Aircraft Corp. is building another fighter in the "100" series, the F-105, which is the highest numerical designation yet announced for an Air Force fighter plane. In June the Farmingdale firm received large scale production orders for the supersonic fighter-bomber which is scheduled eventually to take over Air Force fighter-bomber assignments now being handled by Republic's F-84F. The F-105 is about 1½ times as large as the Thunderjet and is scheduled for production by late 1955 or early 1956. A reconnaissance version, the RF-105, will also be produced. • • •

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Interview

with

E. G. Uhl

Vice President
of Engineering

Glenn L. Martin Co.

Jet Flying Boats and Missiles

E. G. Uhl, at 35, is the youngest vice president of engineering in the industry. After joining Martin in 1946, he conducted guided missiles programs and became successively, Project Engineer, Chief-Pilotless Aircraft, and Chief Project Engineer. He was elected vice president of engineering in 1953.

Before joining Martin he had been graduated from Lehigh University and had served in the Army. He conducted early work on the "VT" proximity fuse and was project officer, designer, and co-patent holder of the bazooka. He was chief of a contract termination section, and served as an ordnance staff officer in Japan. He left the service in 1946, the recipient of a number of citations.

Q. What about the possibilities of designing and producing a high-speed, jet-powered flying boat?

A. The application of flying boat techniques is better suited for larger aircraft than small aircraft. There is more reason to build a jet water-based bomber than a fighter. Flying boats are free from restrictions of having to land and take off on concrete, yet there are only six major cities in the U. S. that can't be reached with a flying boat. Practically all large cities are on large bodies of water.

With the advent of jet engines and progress in hydrodynamic design, the flying boat, from the standpoints of drag and speed, is equal to land-based airplanes. In many cases there is also a weight saving when you go from a landing-gear airplane to a seaplane. On one model the saving amounted to 15% of total weight. I mean by this that the land-based plane would be 15% heavier than the water-based one for the same mission.

Q. Will the engines have to be closed to keep water out?

A. When the aircraft is moored on the water, the engine ducts will probably be sealed. During operation we do not expect to have an engine spray problem. We in the Martin Company have spent a considerable amount of effort to design a hull which suppresses spray. Interestingly, this hull shape has been flight tested in a 2/3 full size configuration. We did this by removing the hull bottom from an XP5M and building our new hull in its place.

Q. What is the size of the P6M, the Seamaster?

A. Exact figures are classified. We can say that it is a four-engine minelayer. The present state of the hydrodynamic art will allow us to design and construct seaplanes of 300,000 to 400,000 pounds and jet powerplants will allow us to fly them at sonic speeds. There are no aerodynamic reasons why seaplanes can't be supersonic. We are not trying to build the fastest boat or the most ultramodern, but rather we are using systems engineering to build a plane for a specific reason. It looks as though it is fairly important to fly close to the ground. We can take a seaplane and fly it as fast or as far as we want to, but we are now principally interested in designing a seaplane to do a specific mission.

Q. Will you experience trouble operating, and particularly taking off from rough seas, with a low silhouette boat?

A. The take-off problem is more serious with a small plane. You don't have this sort of a problem when you are designing a plane to live on the water as we are doing. The same requirements wouldn't exist for a small plane to live on the water simply because it could be picked up. Martin's whole approach is for the plane to live on the water.

Q. What is the role of the Martin Matador?

A. The Matador is a tactical bomber. This is another example of systems engineering, where we designed for a specific mission to be accomplished. It is more important to think about the mission than about the size of the article to be produced. The Matador is not a fighter type, as we see it, but a bomber.

Q. Does the Matador replace the B-51?

A. No—a missile does not replace an airplane. They complement each other. There are missions where planes

are the only thing to have, and there are missions where missiles should be used.

Q. I have heard two complaints about the Matador: lack of range and a guidance system out of all practicability.

A. This is not so. As far as control is concerned, we have a system which is working well. The Matador exceeds the design range. The missile has a good control system and also a guidance system which has worked repeatedly.

Q. What is your opinion on the practicability of retrieving missiles?

A. Some missiles are more like a bullet than an airplane; retrieving a bullet would be rather difficult. When it comes to retrieving a missile, you should look at what you want to get back and the cost of getting it back. It usually boils down to pure economics.

Getting back to the systems engineering philosophy, you must look at the mission to be accomplished; how much effort would have to be put into a retrieving job and how much will be saved. In the Matador, we decided not to spend the time working on making it retrievable but rather in making it tactical.

Q. Does elimination of the pilot on board the missile cut down the inherent complexity and consequent cost of the missile?

A. I think the real reason for removing a pilot from a missile is the fact that the job can be done better without a pilot. Not all jobs can be done well without a pilot. We eliminated the pilot on the Matador because the job can be done just as well without him. It is not a question of trimming off dollars, because in lots of cases the pilot of a missile may be on the ground.

Q. Does the ground-based missile pilot have to be a proficient pilot?

A. In lots of applications where the pilot is on the ground, he has to be more proficient than the airborne pilot.

Q. In your opinion, what are the major design problems in the missile field?

A. In general, practically every guided missile would be a better guided missile with a better guidance system. This is true with ground-to-ground or air-to-air missiles.

Q. Do you see the possibility of a major solution to this problem coming out?

A. It is a state-of-the-art problem and looks like it will be improved slowly.

Q. How big a powerplant can be used in a missile?

A. Just big enough to do the job.

Q. How big does an engine unit get before it should be broken up into two smaller units?

A. I think that in the field of jet engines we probably have gone overboard in increasing the size. Time after time we have a design problem where four smaller engines would be better than one large one. It isn't always smart to make a weapon the biggest and fastest gadget; sometimes smaller ones can do a better job. We have been pressing the engine manufacturers to spend effort on smaller engines —say 5000-pound thrust. We would like to have a small modern turbojet.

Q. Do you see any headway being made?

A. Not much work is being done along th··· lines; no developments are on the books. One of the reasons that a smaller jet engine is so important is for throttling. Since jet engine power can't be controlled efficiently by throttling, it becomes important to be able to shut off one or two engines.

Q. What was Martin's experience with variable incidence wings?

A. They proved very useful in overcoming some inherent design problems related to bicycle-type landing gears on the Martin B-51. After this experience, we are smart enough to design a plane without it.

Bicycle Landing Gears

Q. How about bicycle-type landing gears?

A. There are a lot of times when you should use them, but I don't feel that bicycle gears will replace conventional tricycle gears.

Q. How does Martin look on turboprop-powered aircraft potential?

A. On a seaplane turboprops have all of the disadvantages of a propeller engine with water clearance problems; therefore, you can't reduce the size of the hull. There have been cases where we have studied designs with turboprops, but it just so happens that for the jobs on which we are working today the turboprop is not the correct powerplant.

Q. Do you feel that there is a promising turboprop engine flying today?

A. We don't know of any. If we had to have one, it would be hard to find one. They are marginal from a day-in-day-out operation standpoint.

Q. Is the Martin Company working with atomic energy?

A. Most information in this area is classified. We can say that we have one small government contract for atomic energy research and we are also investing our own money in this field.

Q. Are you working on atomic energy powerplants?

A. We are looking into parameters of power-plant designs because of their relationship to aircraft designs.

"You should not become jack-of-all-trades"

Q. Is the current defense build-up freezing basic designs by putting them into production?

A. This is necessary in any product field. In the past we have not frozen missile designs enough. In order to come up with a good weapon, there has to be a natural bridge from the laboratory to production line; otherwise you would just have paper planes with which to fight the enemy.

Q. How much electronics is Martin getting into?

A. We do not intend to produce any equipment we can buy on the outside. Electronic engineers are an integral part of the weapons systems teams. We have found it important to have enough to do a complete weapons systems job.

Q. Are you actually working on the weapons system concept?

A. We have been in it since 1946 on the Matador. This project was pursued on a weapons system basis. We are into it as deeply as the customer will allow. There is no other way of doing a job in my opinion. In this way, we can set our own pace. About 60-70% of one job that we have may be subcontracted, but we have the overall control.

In the systems approach, you should not become jack-of-all-trades and try to do the entire job yourself. The company that uses this concept as a license to become a jack-of-all-trades is defeating its own best interests.

Q. Is the present approach to the weapons system concept an effective one?

A. There is much being written and many words are being spoken about systems management. It is a fashionable piece of vocabulary in today's weapons business. In my opinion, you aren't equipped for systems management by adding a new word to the vocabulary. To do the job properly, it is necessary to organize in order to carry out efficiently the systems management concept.

B-57: Easy Flying

Q. Is the English-Electric-designed B-57 proving a worthwhile substitute for the Martin-designed B-51?

A. The B-57 does the job that it was bought to do very well—the night intruder mission. It has excellent control for getting around mountains, etc. at night. It also flies at a reasonably high speed so that it is not going to be a sitting duck. We think the B-57 will be a very good flying airplane. It is an easy-to-fly airplane. Long periods of training time will not be necessary in order to enable pilots to handle the B-57. Fairly green kids should be able to fly it.

Q. How extensive were the changes made in the USAF B-57 as compared with the British version?

A. The only configuration change made was the change to an American engine. We have put in a bombing system, guns, and sights. As a result, the airplane today weighs less per pound of thrust than the British version did. It is difficult to compare any two airplanes fairly, but the B-57 will do an equal or better job than the Canberra.

Q. What ever happened to the Martin B-51, the three-jet attack bomber?

A. The B-51 is today flying at Muroc.

Q. What is the ratio of engineers to workers in the Martin Company?

A. There are roughly 2300 people in Engineering. Except for about 150 clerical people, the rest are true engineers. There are about 18,000 people total at Martin.

Q. How about engineering talent brought from Europe and working at Martin?

A. We only have a handful of people from Europe —Hans Multhopp and Ed Winters are two of our veterans.

A New Airfoil

Q. I understand that Multhopp is working on something entirely new at the company.

A. One of Multhopp's biggest contributions to our work here is his fresh approach to a problem. He has come in with a fresh outlook. We all get in some ruts at times. He has some ruts too, but they are German ones rather than American ones; therefore, his approach is fresh to us. About the only thing I can say about his work that isn't classified is that he has proposed an airfoil based on a supersonic theory that is being tested.

Q. What is the status of the Martin-built Viking rocket?

A. The Viking is a test vehicle and we are flying it at a slow rate, a rate dictated by the speed at which people can use the data. We fly three to four missiles a year. Its basic concept is not one of a weapon but it could be converted. We are trying to break our own high altitude record on the next shot. The Viking could also be a two-stage rocket but our object is to get it up as high as possible and bring data back.

Q. Are temperature experiences at high speeds encountered by the Viking proving troublesome?

A. It is not much of a problem going up, but the big problem is coming back. The Viking does not go fast enough to get into serious heat problems, but future rockets may well reach melting temperature on their long trip down.

Q. Have you had any experience with ramjet engines?

A. We had a ramjet on the Gorgon IV. The programs that we have at present do not put us in a position to need a ramjet. These are best used on high-altitude, high-speed planes. Ramjets are here to stay, but there are a number of technical problems associated with them. • • •

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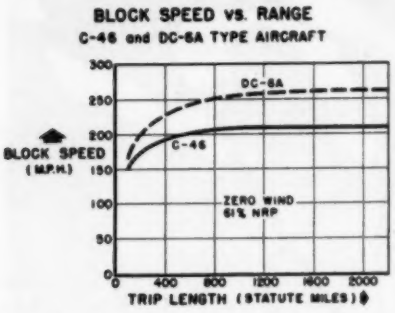
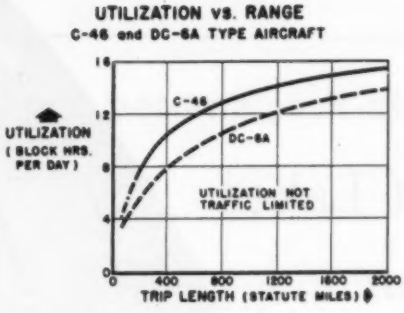
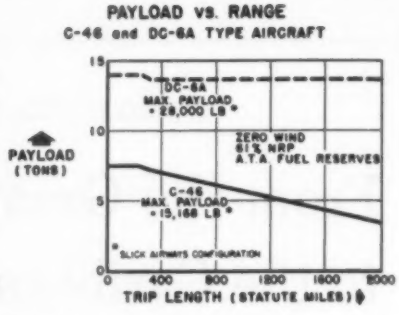


BLOCK SPEED climbs rapidly as trip length increases, then levels off.



GROUND TIME keeps heavier DC-6A utilization below C-46 for all trip lengths.



C-46 PAYLOAD drops off sharply as stage length increases.

A New Look at the Costs of Cargo Flying

Key to realistic choice of aircraft involves not only revenue but initial cost, Slick Airways believes.

By Joseph S. Murphy

IN VIRTUALLY every prediction that has been made pointing up the potential growth of air cargo traffic, and some foretell as much as a billion ton-mile annual business in airfreight alone by 1958, the outlook hinges on the condition that airlines buy and use new and more economical all-cargo airplanes.

Strong feeling in some quarters is that carriers will not really begin to explore this traffic potential until a true all-cargo airplane is designed, one that is not a modified version of a passenger type, and that can be operated at direct costs in the three- to four-cents-per-ton-mile range.

Another contention is that the best cargo airplane is a fully depreciated passenger plane converted for all-cargo operation, and some plan their future activity in air cargo in that direction.

One of the most comprehensive analyses of cargo airplane economics, emphasizing the part played by each of these factors, came recently from Slick Airways' G. A. Busch in a paper presented before the American Society of Mechanical Engineers in Los Angeles.

Using Slick's operation of the C-46 and DC-6A to illustrate an aircraft "economic parameter" for comparing cargo airplanes, Busch concludes that:

• **Douglas DC-6A** is superior to the C-46 in all but short-range operations (350 miles or less) when unit operating expense or annual profit is used as yardstick of evaluation.

• **But when aircraft initial cost** is applied to this profit to obtain the "aircraft economic parameter," the C-46 return on investment becomes greater for all stage lengths up to 800 miles.

Basis of approach taken by Busch, which is used by Slick Airways for comparing cargo airplanes, is the ratio of annual operating profit an airplane can generate to that of its initial cost. In other words, the "economic parameter" is another way of expressing the return on investment used generally in business circles to weigh the worth of a capital investment.

Reducing this "economic parameter" to an equation by which aircraft types can be compared, Busch establishes that:

$$E = (r - c)\frac{P}{C}$$

where E is the "economic parameter," r the unit revenue in dollar/ton-mile, c the unit operating cost in dollar/ton-mile, P the aircraft productivity in ton-miles per year; and C the initial cost of aircraft.

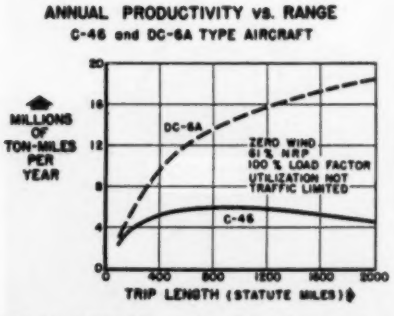
Here the Slick executive points out that the cargo airplane buyer, in studying the economics of his proposed operation, is not only concerned with the plane's characteristics, but also those of the route structure over which it will be flown and the cost structure of his organization that will support its operation.

The reason is that there is an inseparable relationship between the economics of the airplane to be operated and the trip length it will be scheduled to fly. This trip length is a contributing factor in three important elements used in determing the annual productivity *(P)* of the airplane and in arriving at its "economic parameter."

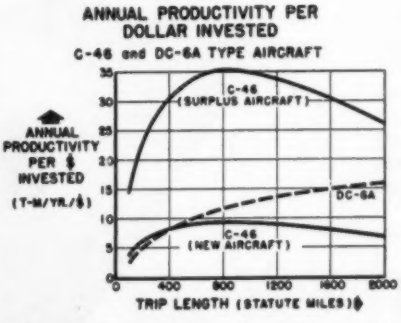
A second equation to represent this annual productivity is expressed by Busch as:

$P = VB \times 365U \times W \times PRF \times LF$

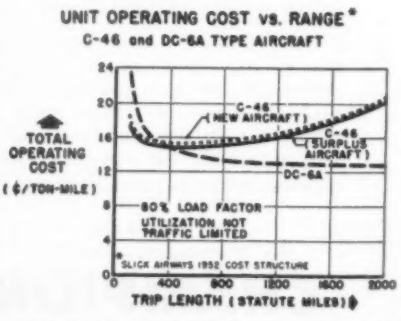
where VB is block speed in miles per



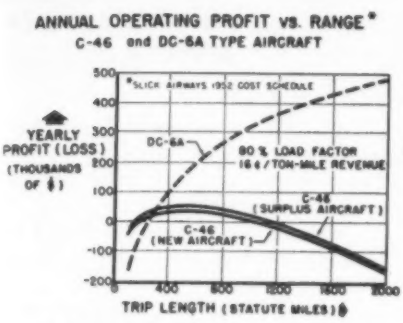
DC-6A LIFT increases with trip length; C-46 reaches peak at 1000-mile stage.



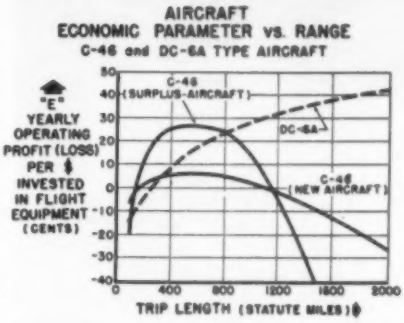
AT 800-MILE STAGE C-46 triples DC-6A revenue per dollar invested.



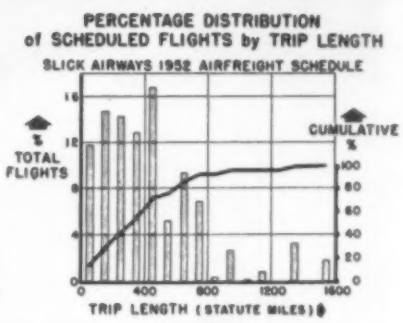
AFTER 400-MILE flight stage, DC-6A costs decline, while those of C-46 rise.


ANNUAL OPERATING PROFIT vs. RANGE*
C-46 and DC-6A TYPE AIRCRAFT
*SLICK AIRWAYS 1952 COST SCHEDULE
YEARLY PROFIT (LOSS) (THOUSANDS OF $)
DC-6A
80 % LOAD FACTOR
16 ¢ / TON-MILE REVENUE
C-46 (SURPLUS AIRCRAFT)
C-46 (NEW AIRCRAFT)
TRIP LENGTH (STATUTE MILES)

WHERE PROFIT is the yardstick, DC-6A is superior for ranges over 350 miles.


AIRCRAFT
ECONOMIC PARAMETER vs. RANGE
C-46 and DC-6A TYPE AIRCRAFT
"E" YEARLY OPERATING PROFIT (LOSS) PER $ INVESTED IN FLIGHT EQUIPMENT (CENTS)
C-46 (SURPLUS AIRCRAFT)
DC-6A
C-46 (NEW AIRCRAFT)
TRIP LENGTH (STATUTE MILES)

ECONOMIC PARAMETER of low-priced C-46 is greater for flights up to 800 miles.



SHORT TRIP LENGTHS prevail; 90% of flights are below 800 miles.

hour; *U* is daily utilization in block-hours per day; *W* is zero-fuel-weight limited payload in tons; *PRF* is payload range factor in percentage; and *LF* is a judgment load factor based on the operator's best estimate of what percentage of available payload will be sold.

Mathematics of the "economic parameter" approach used by Busch offer an interesting comparison of two current cargo airplanes in Slick Airways' operation, the twin-engine C-46 and the postwar Douglas DC-6A.

First step is to develop the annual productivity of each type of airplane by examining its performance in terms of block speed vs range; utilization vs range; payload range vs range; and payload vs range (see charts).

Block speed here is clearly indicated as a function of trip length, and speed climbs rapidly as the range of the trip is lengthened, up to about 800 miles, after which little increase is noted. The Douglas DC-6A then levels off at about 260 mph and the C-46 at about 210 mph. Effect of reduced time spent in the higher cruising speed range on short trips is evident, but its effect increases as the trip length becomes greater.

Utilization is also dependent on trip length, Slick's experience shows, and is based upon scheduled elapsed time in maintenance per block-hour flown, and both scheduled and non-scheduled ground time per landing. Best utilization of the DC-6A is seen is less than that of the C-46 for any given trip length, explanation being that scheduled period of "on the ground" time per landing is assumed to be independent of trip length, and is longer for the DC-6A than for the C-46.

The higher block speed of the DC-6A allows it to fly a given trip length in fewer hours than the C-46, but with a greater number of landings per day and longer "on the ground" time, the DC-6A is in the air fewer hours in a 24-hour period, although it may fly many more miles than the C-46. The penalty paid by high speed aircraft in short trips is also evident; for operation over a 400-mile stage length, best utilization for DC-6A is eight hours, while that of C-46 is 11 hours.

Payload range factor, defined as per cent of maximum zero-fuel-weight limited payload which may be carried over a given trip length shows a rapid decline for the C-46 as stage is increased over 200 miles, while long-range DC-6A remains virtually unaffected by trip lengths up to the 2000-mile limit of Busch's study. More familiar payload-range curve in accompanying illustration is developed by multiplying this payload range factor by the zero-fuel-weight limited payload, and points up the maximum available payload for any given trip length.

Annual productivity, a measure of the revenue- (but not profit-) generating potential of the airplane, and a key factor in the Busch "economic parameter," shows the C-46 at its best when operated at trip lengths of about 1000 miles. Annual lift capacity of DC-6A continues to increase with trip length over entire 2000-mile scale, producing 10 million ton-miles for 400-mile stages, and 16 million miles for 1200-mile stages.

But annual productivity becomes even more meaningful when divided by airplane initial cost in the "economic parameter." Busch separates the C-46 into two categories, one for the present surplus market price (about $150,000) and another estimating the current replacement cost (about $575,000) if a new C-46 were to be built. The resulting annual productivity per dollar invested clearly shows the effect of trip length, with the low-initial-cost surplus

Economic Parameters

For Slick Airways 1952 Route Structure

Range of Trip Lengths	Total Scheduled Trips (Per Cent)	Aircraft Economic Parameter "Surplus" C-46	Aircraft Economic Parameter "New" C-46	Aircraft Economic Parameter DC-6A	Route Economic Parameter "Surplus" C-46	Route Economic Parameter "New" C-46	Route Economic Parameter DC-6A
0- 100	11.8	(33.0)	(12.5)	(20.0)	(389.40)	(147.50)	(236.00)
101- 200	14.7	(2.5)	(3.5)	(6.5)	(36.75)	(51.45)	(95.55)
201- 300	14.2	17.0	2.5	(1.0)	241.40	35.50	(14.20)
301- 400	12.9	23.0	4.0	4.5	296.70	51.60	58.05
401- 500	16.7	25.5	4.5	9.5	425.85	75.15	158.65
501- 600	5.2	26.5	5.0	13.5	137.80	26.00	70.20
601- 700	9.4	26.0	4.8	17.5	244.40	45.12	164.50
701- 800	6.9	25.0	4.5	21.5	172.50	31.05	148.35
801- 900	0.3	20.0	3.5	24.0	6.00	1.05	7.20
901-1000	1.9	14.0	1.5	26.5	26.60	2.85	50.35
1001-1100	0.1	6.0	(0.5)	29.0	0.60	(0.05)	2.90
1101-1200	0.8	(2.0)	(2.5)	31.5	(1.60)	(2.00)	25.20
1201-1300	0.0	(10.0)	(5.0)	34.0	0	0	0
1301-1400	3.2	(20.0)	(7.5)	36.5	(64.00)	(24.00)	116.80
1401-1500	0.0	(31.0)	(10.0)	39.0	0	0	0
1501-1600	1.9	(42.5)	(12.5)	41.5	(80.75)	(23.75)	78.85
Summation..	100.0				979.35	19.57	535.30
					9.79	0.20	5.35

Note: Route economic parameter for each type aircraft is determined by multiplying aircraft economic parameter by per cent of total scheduled trips for that stage length. Total for all ranges (0-1600 miles) is then divided by 100%, representing all scheduled trips. Negative figures are shown in parentheses.

A Northrop Prime

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C-46 offering a revenue-generating capacity at a bargain price, more than three times that of the DC-6A at 800-mile stage lengths.

But this represents only revenue produced per dollar invested and not the profit on that investment, which the operator is seeking.

This profit, expressed by unit revenue per ton-mile less unit cost (both direct and indirect) per ton-mile gives a different picture. Here, for sample purposes, basic Slick tariff of 16¢ per ton-mile is used for unit revenue, indirect cost of 5.72¢ per ton-mile for indirect cost and unit direct cost as it varies by trip length is accurately estimated and illustrated.

Direct cost factors not affected by stage length (such as insurance and depreciation) are figured on typical values; insurance is based on annual premium of four per cent of aircraft book value, and depreciation for DC-6A and "new" C-46 is based on 10 years useful life depreciated to 10% residual value. Surplus C-46 is depreciated in three years to zero residual value.

Result shows that DC-6A total operating costs, although very high for short trip lengths, drop below those of C-46 for stages over 400 miles, and when plotting unit revenue less operating cost, DC-6A appears superior to C-46 whether new or surplus at all stages above 350 miles. Thus in using annual profit as the yardstick of judging comparative economic potential of the aircraft, DC-6A is superior in all but short-range operations.

This does not complete the "economic parameter" however, and it is necessary to qualify this annual profit, dividing it by the aircraft initial cost to show the all-important return on investment. Here the low priced C-46, despite its higher unit operating costs, emerges with the better return for all trip lengths up to 800 miles. But if this C-46 had to be purchased at today's $575,000 price, the scene changes again, and the DC-6A becomes the superior investment for all but the very short ranges, those of 300 miles or less.

With the "economic parameter" established, the operator's route structure is analyzed to illustrate the frequency of trip lengths to be operated on a percentage basis. For Slick's 1952 schedule, nearly 60% of all flights were less than 400 miles and 90% were less than 800 miles. Applying this data to a carrier planning operation of only one type aircraft on such a schedule, the answer is obvious: the airplane with the greater "economic parameter" for ranges up to 800 miles, in this case the C-46, would be the one to choose.

• • •

Navigators End Strike at TWA

Two-week strike of 90 navigators against TWA's Atlantic flights ended July 22 when CIO-Transport Workers Union members ratified an agreement proposed by National Mediation Board. Strike, which resulted in cancelation of 98 flights, was called to protest TWA's elimination of navigators on Paris-Rome route.

TWA said that under the agreement navigators conceded the walkout was not in compliance with Railway Labor Act and violated the existing contract. They also recognized TWA's right to use navigators as it sees fit. In return, the airline "rehired" navigators who were "fired" when they failed to report for work.

F-89 Modifications Completed by Fall

Modification work on early model F-89 Scorpions will be completed this fall by Northrop Aircraft Inc. Wing structures on more than 60 have already been corrected and some of the planes have returned to Air Force service. F-89's were grounded last fall because of structural problems.

Modifications include replacing extruded wing-attach fittings with heavier machined fittings and installing horizontal fins on the wing tip tanks. Northrop is continuing to produce its current F-89D, incorporating the wing structural changes as they come off the line at Hawthorne, Calif.

New Glide Slope Receiver by Bendix

A new ILS glide slope receiver has been announced by Bendix Radio Division of Bendix Aviation Corp., which also revealed that United Air Lines has purchased 79 of the units for installation in its DC-7's.

New receiver, model MN-100A, weighs less than 13 pounds, provides 0 channels in the frequency range of 29.3 to 335.0 megacycles, and has a self-contained plate supply which requires 115-volt, 400-cycle A-C current.

VAL Installs Analyzers

Western Air Lines completed installation of Land-Air ignition analyzers in Douglas DC-6B's and purchased four portable units for use at Los Angeles and other key stations in line maintenance of Convair 240's.

CONVERSION of four Sikorsky S-55's for passenger and cargo operations in New York area was handled by Lockheed Aircraft Service-International.

Conversion of an S-55

FLOOR FITTINGS to accommodate seats are laid out by LASI mechanic.

CARGO GATE POSTS, with nylon webbing, can be installed in one minute.

SEATS FOR SEVEN can be folded against side of fuselage, or quickly removed.

ARCHITECTURE OF ZURICH TERMINAL presents distinctive, honeycomb-like appearance.

Zurich's New Terminal: European Showplace

Design features speed traffic flow, meet travelers' needs; building is termed finest on Continent.

By William D. Perreault

WITHIN the next few weeks the new $2¾ million terminal at Zurich, Switzerland, will be formally dedicated. Already 13 scheduled air carriers linking Zurich with the rest of the world have switched all their operations to this airport and traffic is growing by leaps and bounds.

Zurich's new Kloten airport terminal is the finest in all of Europe and one of the finest in the world. Since its official opening on April 9 it has had ample opportunity to prove the many design features which make it stand out in contrast to any airport:

- **Complete separation** of incoming and outgoing passengers.
- **Complete separation** of passengers and baggage in the terminal area.
- **Wide-open areas** in which visitors and passengers alike can circulate.
- **Three restaurants** of varying standards to meet individual tastes.
- **The best organized customs** arrangements anywhere.
- **Unparalleled rest room** facilities, including free shower rooms and rest places for mothers and young children.
- **A location** which makes downtown connections possible in under 20 minutes.

Today Zurich-Kloten airport can handle up to 3000 passengers a day or some 40 airplanes an hour. Passengers arriving from the city drive up a ramp to the front entry of the terminal. Just inside the front door (see photo) a single ticket counter provides a checking-in point for all passengers. Swissair handles all passengers for 12 of the 13 lines serving Zurich. Only TWA still uses individual facilities for this purpose.

The center hall is wide enough to assure that persons accompanying passengers into the terminal are not intermingling with passengers in the ticketing area. Instead they move through the marble-framed hall to the front of the terminal, where a solid wall of glass provides an excellent view of the entire field.

Between the ticketing counters and the visitor's area at the front of the terminal, the passenger moves downstairs into the departure waiting room (see photo) where there are comfortable chairs and good restaurant facilities. Customs clearances, necessary on virtually all flights in and out of Zurich, are on this floor.

The deplaning passenger moves from the plane through customs and out the front of the terminal without fighting incoming traffic. Baggage from the same plane is carried on trucks down a ramp onto an underground level, where it is hoisted by elevator to the pick-up room.

Many of the design features, from the glass-walled terminal to the baggage routing, were designed to resemble those at Washington National Airport. However Zurich has had the benefit of Washington's experience and this shows in many of the detail changes which have eliminated bottlenecks now experienced in Washington.

The terminal, as well as the hangars and workshops on Zurich-Kloten airport, is financed and operated by a private company, Flughafen-Immobilien-Gesellschaft. The president of this or-

SWISSAIR handles ticketing for all 13 lines except TWA, which maintains its own facilities. Wide hall separates incoming, outgoing passengers.

ganization is Henrich Hurlimann and he is assisted by Dr. Meirhaus, as vice-president, by Dr. H. U. Schlarpfer as treasurer, and by three other executives.

The terminal was financed 51% by private funds and 49% by the Canton of Zurich and the towns of Kloten and Winthentur. Arrangements are such that the private operating company must assure its recapture of the basic investment within 75 years, at which time the terminal becomes the property of the Canton of Zurich, plus an annual return of not more than four per cent on the investment.

To assure this the operating company has considerable leeway in setting up fees for various services and rentals. Fees range from $6.70 per square meter per year in the basement and $18.20 for office space on any floor to about $45.45 in the lobby.

Revenues from such standard items as the restaurant (10% of revenues) and barbershop, bank, post office, newspaper stand, etc., are supplemented by Zurich's aviation-minded visitors at the airport. There 4000-5000 people, paying 20 Swiss cents (5¢ U.S.), use the observation decks on Sundays. Over the four-day Easter holiday almost 25,000 people used these facilities.

Another novel arrangement is the small tractor-towed observation cars which seat up to 160 people. In 1952 these sight-seeing vehicles, which give visitors a 15-minute tour around the field, attracted 55,900 passengers and the outlook is for 70,000 this year.

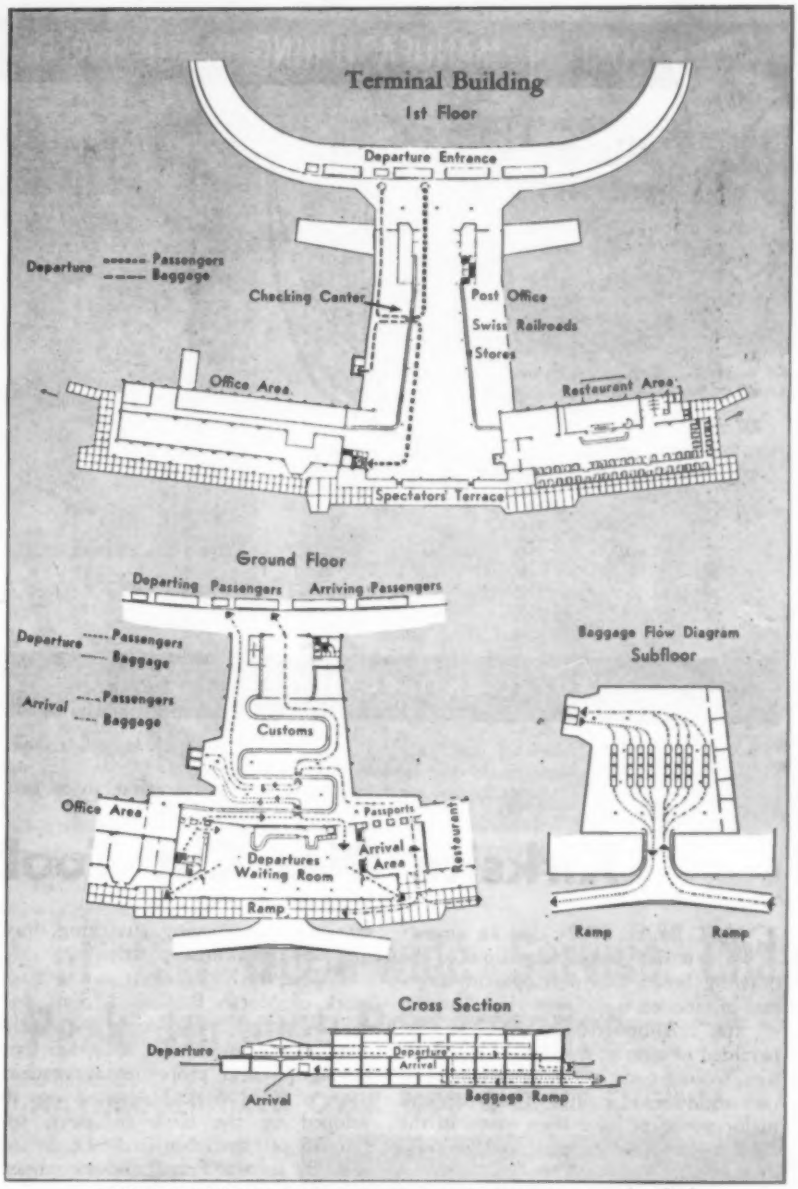
The airport also gets revenue from the fuel used by the operators. The companies pay about two cents per gallon for fuel servicing and 3.5 cents for oil.

One operating expense which this airport, unlike U. S. airports, has to handle is that of navigation and landing aids. Such items as the instrument landing system at Zurich are operated and maintained by Radio Swiss, with the airport paying cost plus 10% for those assigned to its area.

The manner in which traffic, both passenger and cargo, is swelling at Zurich-Kloten airport is best shown in these tables:

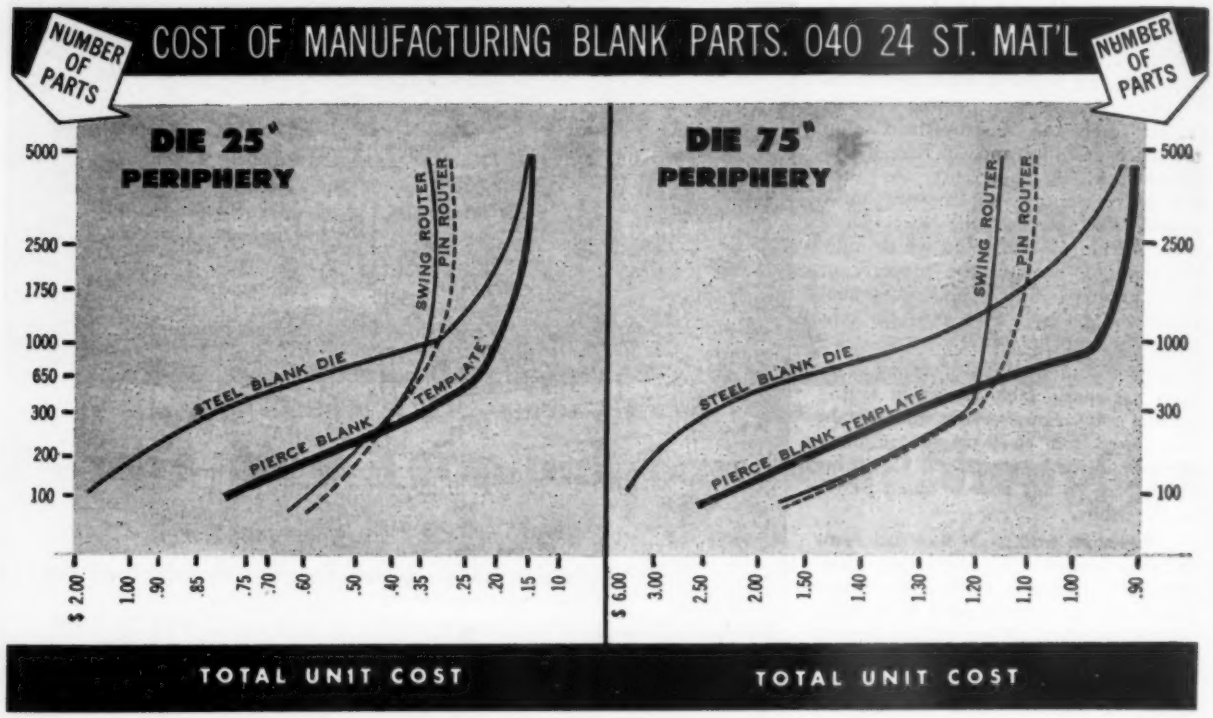
	Flights	Airline Flights	Airline Passengers
1946	28,393	7,782	90,120
1947	30,484	12,766	133,638
1948	28,208	13,279	147,095
1949	36,204	16,553	213,771
1950	30 123	15,372	245,629
1951	32,524	19,660	336,172
1952	36,053	24,728	372,832

Cargo	
1946	597 tons
1947	1,142
1948	1,391
1949	2,351
1950	4,506
1951	5,696
1952	6,406



FLOOR PLANS show how baggage and passengers are handled.

SPACIOUS LOUNGE faces on field, boasts modern decor.



LOW COST Kirksite blanking dies, called Pierce Blank Templates, become economical at low quantity production, are surpassed by steel blanking dies when production exceeds 5000 parts, Glenn L. Martin study shows. Analysis includes cost of tooling, material, set-up and run time. As size of dies increases, so do savings from Kirksite.

Kirksite Dies Cut Tooling Costs

FIRST REAL SIGN that an aircraft of new design has moved out of the drawing board and development stages into production is the proverbial "cutting of tin." Although one of the less heralded of aircraft manufacturing activities, tooling costs involved in this operation are no small matter of expense, and major advances have been made in the field to cut this expense and increase production.

Prominent among these advances, and one singled out recently by Aircraft Industries Association president DeWitt C. Ramsey, speaking before members of the Institute of the Aeronautical Sciences in Baltimore, Md., is the use of Kirksite blanking dies. These dies increase production rates and reduce costs and maintenance expense, Ramsey said, adding that estimates show a 30% saving on upkeep over steel gay dies.

Actually the use of Kirksite as a die metal is not new, but its spreading use in blanking operations is bringing new savings to the aircraft industry where today nearly 95% of all sheet metal blanking calls for Kirksite dies.

Kirksite, which got its start in one area of aircraft production as a die metal in drop hammer forming operations, has now engulfed the whole field of parts fabrication, in forming, stretching, drawing, and blanking operations.

What is Kirksite? It is the trademark of Morris P. Kirk & Sons, Inc., of Los Angeles, the name for a zinc alloy containing about 90% zinc and having physical properties approaching those of mild steel. The metal was developed by the Kirk company, subsidiary of the National Lead Co., specially for the aircraft industry shortly before World War II, and has been credited to a large extent for mass plane production achieved in the war years.

Big attractions that have spelled success for it in aircraft manufacturing are faster production and lower costs.

• **Die production** using Kirksite has been achieved in less than one third the time required by conventional steel dies for blanking operations. At Glenn L. Martin Co., where an equivalent steel die required 40 hours to produce, a Kirksite die can be turned out in 16.

• **Lower initial cost** of Kirksite brings added savings. Selling for about 15.5¢ per pound compared with a range of 35-75¢ for tool steels, depending on quality, the zinc alloy becomes a worthwhile investment.

These savings are multiplied in salvage. Common practice in aircraft manufacturing is to retain blanking dies for a year after contract expiration, and sometimes longer. Here use of Kirksite not only reduces investment in idle blanking dies, but when die finally becomes obsolete, the material is 100% salvageable. Low melting point of Kirksite (about 717° F.) makes it readily suited to remelting to produce dies or blocks for drop hammer or stretching.

With thousands of tons of Kirksite being reused repeatedly by industry annually, these savings are contrasted to the expense of steel blanking dies, which upon retirement bring only the scrap value of steel—about a penny a pound.

Efforts among manufacturers to control tooling costs closely are demonstrated in studies which point up the relative costs of producing sheet metal parts (see charts above). Experience has isolated costs of various methods, such as pin or swing routing, use of Kirksite Pierce Blank Template (PBT) dies as they are called, or steel dies.

Martin tool engineers set the minimum production at 275 parts before the cost of Kirksite die production would be justified, with lesser quantities calling for routing. For blanking large quantities, in the order of 5000 parts, production of the more expensive steel die becomes justified. • • •

CAREFUL INSPECTION of all jet engine parts is an important phase of the work done at General Electric's Los Angeles modification shop.

WEST COAST DEFENSE is fortified by North American F-86D. L.A. shop assures plane's G-E powerplant peak performance.

INSTALLATION OF AFTERBURNERS is typical L.A. shop job. Facility can be quickly adapted to other engine projects.

West Coast Link of G-E World-wide Service Chain Assures Peak Turbojet Performance

LOS ANGELES SHOP HAS MODERNIZED OVER 1000 G-E JET ENGINES

OPTIMUM ENGINE PERFORMANCE is assured users of G-E turbojets by G.E.'s world-wide jet service engineering organization. For example: The Los Angeles modification shop—West Coast link of this world-wide chain—has modernized more than 1000 G-E jet engines.

AS ENGINE IMPROVEMENTS are developed by G-E engineers, they are incorporated by the modification shop. This assures users of G-E engines in service of the latest advances even before these improvements can be tooled into the mass production lines.

WEST COAST AIRFRAME MANUFACTURERS, and USAF depots and bases using G-E jet engines, are served by the centrally-located L.A. shop. Additionally, trained shop representatives are sent into the field to assist and teach operating personnel new techniques and the use of new tools. Training programs are also conducted by the shop for G-E jet engine users as well as G-E personnel.

MEETING THIS IMPORTANT STEP in the manufacturer-to-operator process, the L.A. modification shop is another of the many services offered G-E jet engine users. *General Electric Co., Schenectady, N.Y.*

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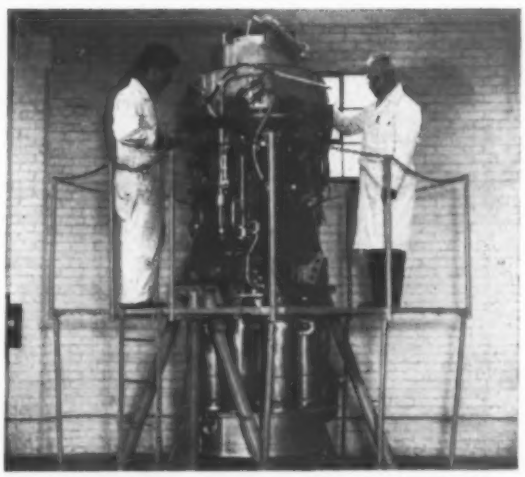


SPECIAL STAND (above) and other Company-developed tools and jigs save time and cost of rebuilding engines.

You can put your confidence in—

GENERAL ELECTRIC

The Military Scene

Showing off its ability, Avro Canada's CF-100 long-range interceptor is photographed from a companion plane while the two do loops in formation. Production contract for Mark 3 CF-100's was completed ahead of schedule for RCAF.

Slotted helmet, developed by Douglas engineers, reduces shock from air blast at supersonic speeds. Helmets without slots tend to be torn off. Partial vacuum holds new helmet firmly in place. Each helmet must be fitted to the individual pilot.

Portable starter unit, shown at left with a turboprop Douglas A2D Skyshark, cuts aircraft weight and can be slung beneath plane while being ferried to a new base. Unit was developed by Douglas; models are being designed to operate with other manufacturers' aircraft.

A MILITARY COMMENTARY . . .

North American Keeps it in the Family

BREAKING the officially recognized world speed record has become a one-plane affair, with the F-86 Sabrejet holding this honor for nearly five years now. North American Aviation, Inc., has established such a solid hold on this air speed championship that it's somewhat comparable to the monopoly the New York Yankees have held in major league baseball the past five years. Diamond fans have wondered for some time if there will ever be a better baseball team; aircraft industry observers now try to guess what airplane will eventually surpass the F-86 world speed mark.

Here are the official Sabrejet accomplishments in boosting the record (date mark broken, Air Force pilot, and speed):

- July 16, 1953—Lt. Col. William F. Barns—715.7 mph
- November 19, 1952—Capt. J. Slade Nash—698.5 mph
- September 15, 1948—Lt. Col. Richard L. Johnson—670.98 mph

Colonel Barns just two weeks ago piloted an F-86D model four times across an official three-kilometer (1.863 mile) California test course, averaging the 715.7 mph speed. Only a half hour earlier he had made four passes averaging 713.6 mph over the stretch of wasteland located in the Imperial Valley between Indio and Brawley on the eastern shore of the Salton Sea. Eight months earlier Captain Nash, also in an F-86D, had broken the record over the same speed course.

Colonel Johnson (then a major) flew one of the early Sabres, an F-86A, over an officially measured course at Edwards Air Force Base, Calif., for a new mark four years earlier. Ten days before this he had piloted the F-86 over a measured course at the Cleveland Air Races at 674 mph, but the record was nullified because of several incidents, including the mechanical failure of one of the timing cameras.

Before Colonel Johnson's record, the coveted high-speed mark was 650.8 mph, set by Marine Lt. Col. Marion E. Carl in a Navy D-558 Skystreak. Since then, though, the Air Force, North American, and the Sabrejet have held a tight monopoly on the officially recognized world record.

Although he holds the top mark, Colonel Barns has not flown as fast as a number of others. These are the pilots of the experimental aircraft, the X-models, etc. Such flights, however, have not been recognized as "official" world records under the regulations of the Federation Aeronautique Internationale and the National Aeronautic Association.

Fastest speed officially announced is 1238 miles an hour, reached in August, 1951, by Bill Bridgeman, who flew a Navy Douglas D558-2 Skyrocket after it was launched from a mother B-29 Superfortress over Edwards Air Force Base, Calif. In this same flight Bridgeman established an altitude record of 79,494 feet.

In 1946 another research aircraft known as the rocket-propelled Bell X-1 changed the overall perspective on the speed of flight when it spurted through the sky for a few instants at a speed around the 1000-mph mark. This was never recognized as an official flight speed record, but it enabled Air Force Major Charles Yeager to become the first to fly through the sonic barrier.

The research planes did not make their speed runs under contest conditions, as Colonel Barns and the former official record holders did. The F-86's could not exceed 500 meters altitude (1640 feet) at any time after take-off, and they were not permitted to fly above 100 meters (328 feet) during the official recording and filming along the 1.8 mile course on the four required passes. Colonel Barns flew at an altitude of about 100 feet, getting a good running start to obtain maximum speed over the actual test course. The much faster research aircraft, on the other hand, accomplished their very fast flights at altitudes of 60,000 feet and above.

Another significant factor regarding the official speed runs is that the test craft must be a standard type airplane rather than an experimental type. The F-86's were fully equipped as though they were on operational duty defending the United States from attack. Colonel Barns carried a simulated ammunition load aboard the Sabrejet plus all of the other equipment customarily involved in regular Sabrejet missions in Korea.

Sabrejet superiority seems to be ever present, both on the home front, where F-86's push up the world speed record, and over the North Korea battlefront, where they have run up a lop-sided score over Russian MiG-15's.

Sabres have downed 15 MiG's for each F-86 lost in the air war. Up to the middle of July only 56 of the North American-produced jet fighters were lost in combat since the start of the sky fighting. During a 71-day stretch in May, June, and July the Sabrejets shot down 122 of the Communist jets with only one "86" downed. It's great to be a Sabrejet—especially in the Korean war.

It may be some time before North American's leadership with a record-holding combat jet fighter is challenged. Already undergoing flight tests is the company's F-100, a faster-than-sound jet which is being considered as a successor to the Sabrejet. This model with the three numerals is expected to be the world's first supersonic plane, and the first capable of supersonic speeds at level flight (see story on p. 24).

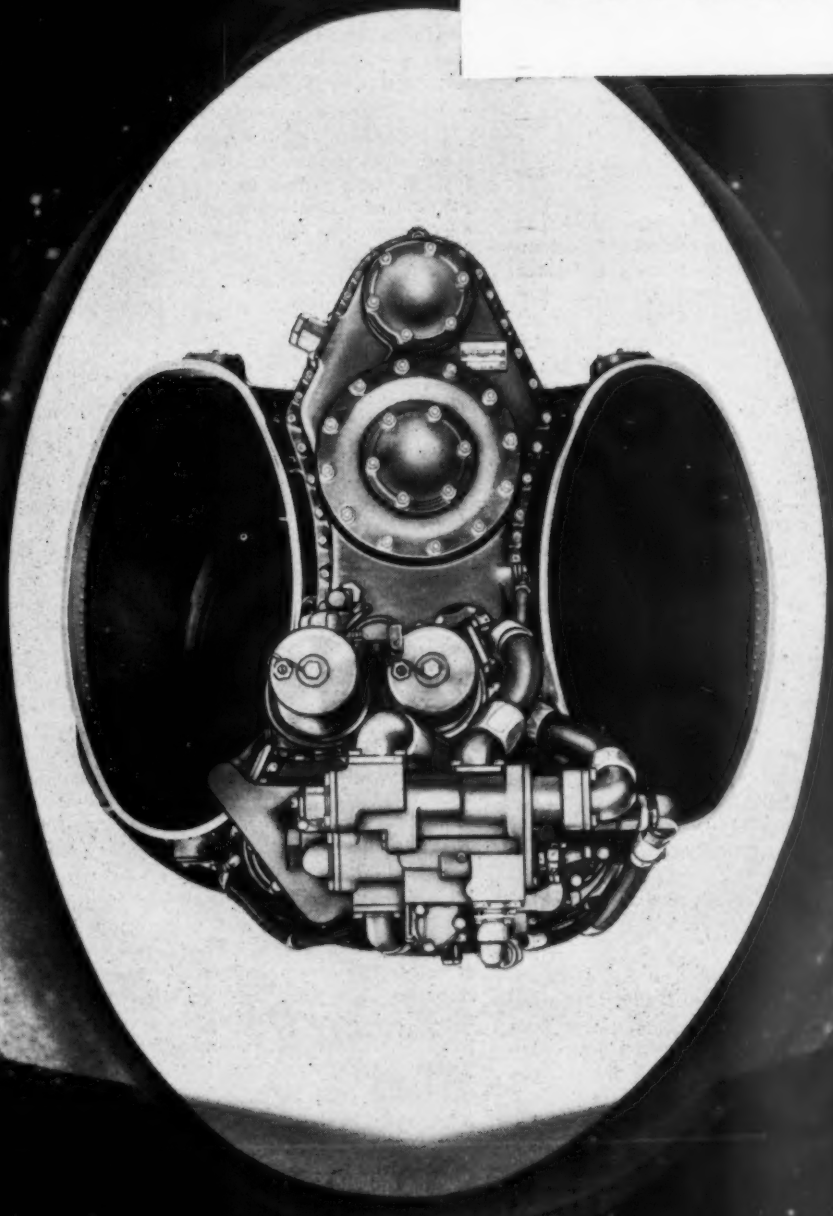
The F-100 is larger than the F-86 and is powered by a Pratt & Whitney J57 engine, capable of putting out 10,000 pounds of thrust. A hand-made prototype of this plane in tests at Edwards Air Force Base, Calif., reportedly achieved level flight speed of Mach 1.08 recently. This plane was delivered to the test base a month ahead of schedule and it has been said that production orders for an undisclosed number of F-100's, placed last October, are "ahead of schedule."

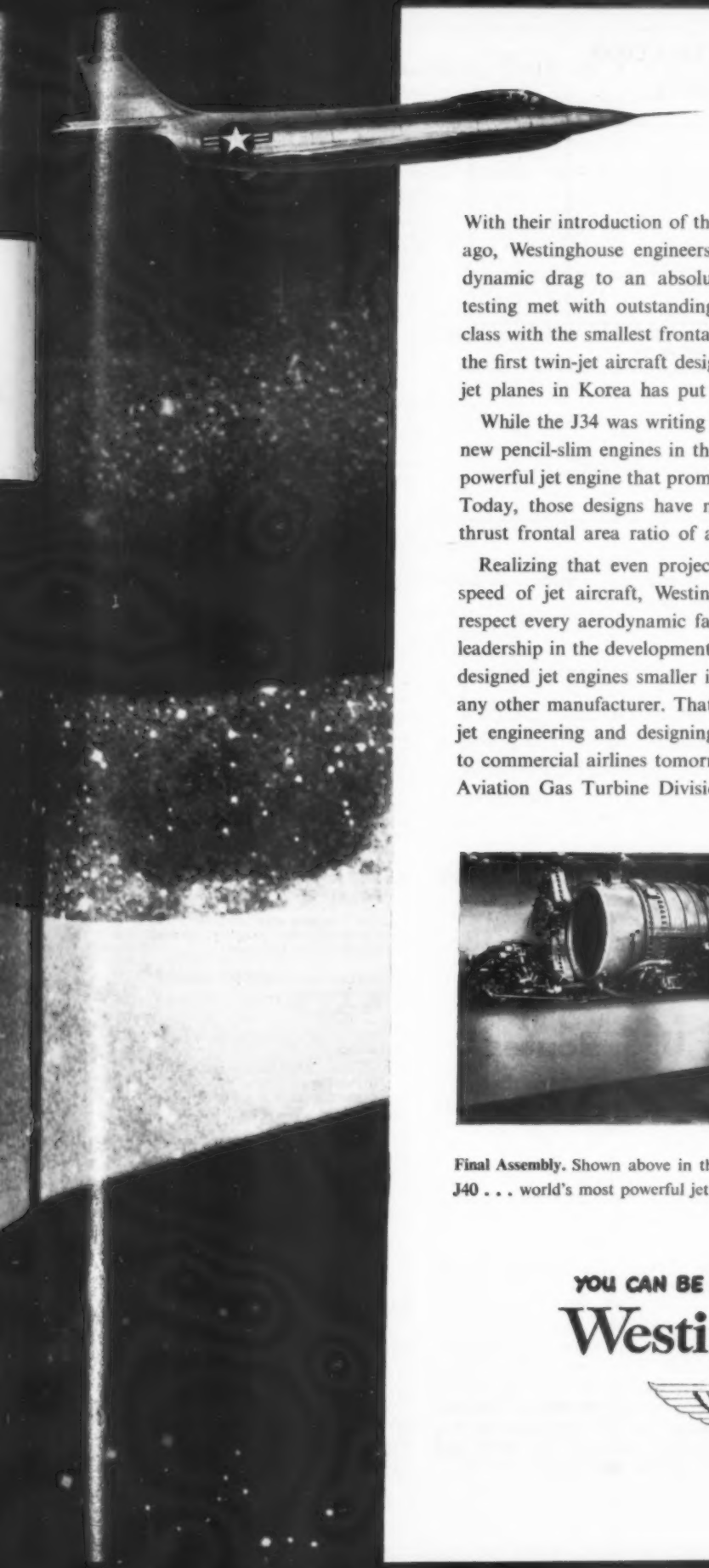
With this to look forward to, it would seem more than likely that the F-100 may soon grasp the world speed record from the F-86—keeping it in the North American Aviation family.

. . . HARRY S. BAER, JR.

HIGHLIGHTS IN *Jet Engineering*

New jet engine designs further reduce frontal area





With their introduction of the first axial-flow jet engine over ten years ago, Westinghouse engineers expanded their efforts to reduce aerodynamic drag to an absolute minimum. Continued designing and testing met with outstanding success on the J34 engine, first in its class with the smallest frontal area per pound of thrust . . . permitting the first twin-jet aircraft design. The unequaled performance of twin-jet planes in Korea has put real meaning in that record.

While the J34 was writing jet history in combat, Westinghouse had new pencil-slim engines in their test cells . . . new designs for a more powerful jet engine that promised even greater latitude in plane design. Today, those designs have made possible the J40 with the smallest thrust frontal area ratio of any announced engine.

Realizing that even projecting rivet heads can have effect on the speed of jet aircraft, Westinghouse engineers know that they must respect every aerodynamic factor. That is why they have maintained leadership in the development of axial flow engines . . . why they have designed jet engines smaller in diameter for given power output than any other manufacturer. That is why they have acquired a wealth of jet engineering and designing knowledge that will prove invaluable to commercial airlines tomorrow. Westinghouse Electric Corporation, Aviation Gas Turbine Division, Philadelphia 13, Pennsylvania.

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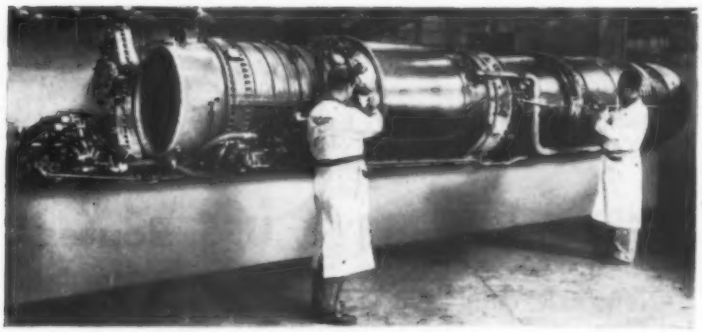


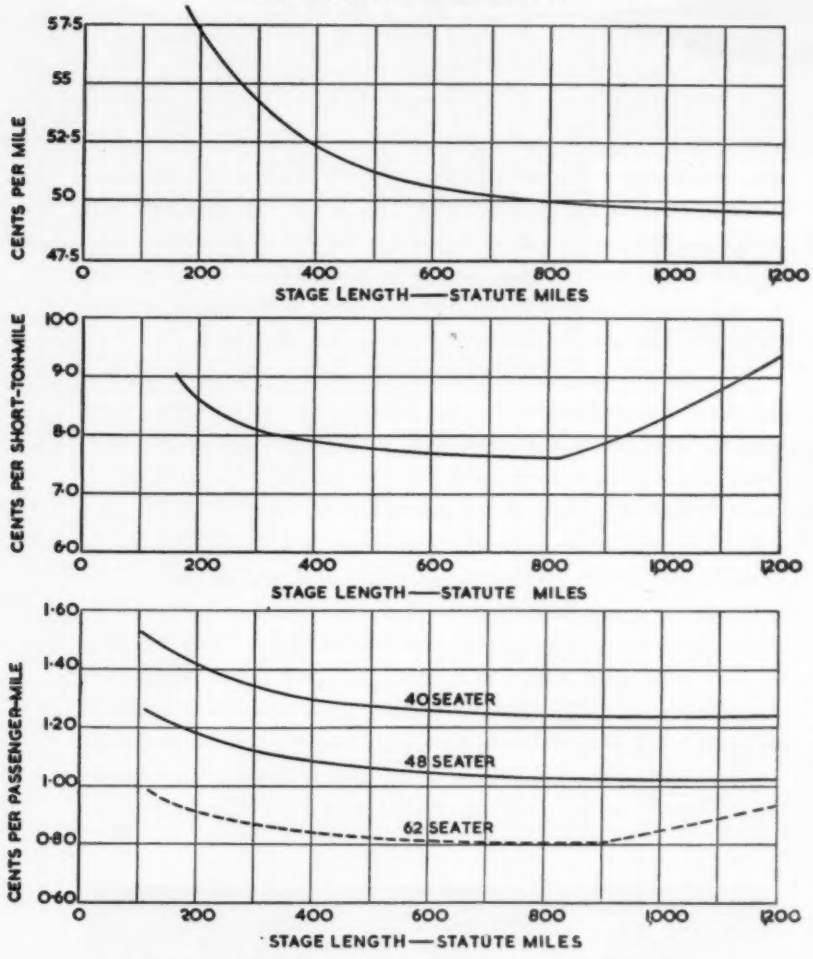
Final Assembly. Shown above in the last stages of assembly is the Westinghouse **J40 . . .** world's most powerful jet engine, fully qualified for production.

YOU CAN BE **SURE**... IF IT'S

Westinghouse

AIR AGARY LIBRARY

DIRECT COST OF OPERATION IN NORTH AMERICA



DIRECT OPERATING COST for the Viscount 700 is based on an 800-hour overhaul period for the plane's Rolls-Royce Dart turboprop engines. Vickers-Armstrongs calls this a "conservative estimate" for 1955.

How Viscount Would Fly U. S. Routes

New sales approach by Vickers gives details of performance and cost on American runs.

STUDIES showing the potentialities of the Viscount on typical U.S. airline routes have been prepared by Vickers-Armstrong Ltd. as part of a program to promote the turboprop transport in North America (Trans-Canada Air Lines has already bought 15).

To date Vickers-Armstrongs has received firm orders involving a total of 84 Viscounts. This includes 38 for British European Airways, 15 for TCA, 12 for Air France, six for Trans-Australian Airlines, four for Aer Lingus, and three each for British West Indian Airways, Hunting Air Transport, and Iraqi Airways (latter was announced at the end of last month).

The data in the Viscount North American studies is for the 700 Series, accommodating 40 or 48 passengers. This is the series that is already in operation on BEA trunk routes in Europe. At the moment the Viscount 700's Rolls-Royce Dart powerplant is being cleared for a longer overhaul life and Vickers-Armstrongs considers 800 hours to be a "conservative estimate" for 1955; this figure is used in the studies.

In addition to performance data the studies include detailed information on costs. Here, for example, are costs for the Viscount 700 on some typical stages.

	New York to Washington	Albuquerque to Kansas City	Minneapolis to Spokane
Stage length, miles	217	733	1,178
Block time, hours	0.83	2.62	4.23
Block speed, mph	259	280	279
Payload, pounds	13,156	13,156	10,766
	Dollars per flying hour	**Dollars per flying hour**	**Dollars per flying hour**
Fuel cost (kerosene at 10.5¢ per gal.)	42.3	36.0	34.3
Total fixed cost	104.04	104.04	104.04
Total direct hourly cost	146.34	140.04	138.34
	Cents	**Cents**	**Cents**
Direct cost per mile	56.5	50.02	49.5
Direct cost per short-ton-mile	8.6	7.64	9.22
Direct cost per passenger-mile —40 seater	1.41	1.25	1.24
—48 seater	1.18	1.04	1.03

In the compilation of the above figures and the accompanying charts the following basic data were taken into account:

Basis for Depreciation	Dollars
Total aircraft cost, complete with basic radio, pantry and autopilot	663,600
Powerplant	137,760
Cost of aircraft—less powerplant	525,840
Cost of airframe and equipment spares (10% backing assumed)	52,584
Amount to be depreciated, airframe equipment, etc.	578,424
Cost of engines and propellers	137,760
Cost of engine and propeller spares (50% backing assumed)	68,880
Amount to be depreciated, engines and propellers	206,640

Fixed Costs	Dollars per flying hour
Assuming 3,000 hours per annum utilization	
Depreciation —assumed 10 year life and 10% residual value	
Airframe, equipment and spares	17.35
Powerplant, propellers and spares	6.20
Insurance 4.75% per annum plus third party cover	10.30
Interest on capital 3% per annum on first cost of aircraft and all spares	8.00
Total Annual Cost	41.85

Maintenance and Overhaul

(An average labor rate of $2.00 per man-hour is assumed):

	Man-hour per flying hour	Dollar per flying hour
Airframe maintenance	0.75	1.50
Airframe overall: 25,000 man-hours/7,000 flying hours	3.6	7.20

Chicago–New York in a Viscount (763 Miles)

I.S.A. Conditions

Assumed: 13,600 rpm for cruise at 22,500 ft.
Headwind: 10 mph

FLIGHT PLAN

	Time mins.	Distance miles	Fuel lbs.
Climb to 22,500 ft. from 653 ft.	42	160	1,950
Cruise at 22,500 ft. and 308 mph T.A.S.	110	545	4,050
Descend from 22,500 ft. to sea level	13	58	245
Fuel allowance for take-off, landing and taxi	..	..	150
TOTALS	165	763	6,395

BLOCK TIME—2.75 hours. BLOCK SPEED—278 mph

AIRPORT PERFORMANCE

	Feet
Normal take-off to 50 ft.	5,010
Take-off to 50 ft., or stop, with one engine failing at the critical point	5,640
I.C.A.O. landing from 50 ft.	2,640

RESERVES

HOLDING: 60 minutes at 5,000 ft. on 3 engines—1,940 lb. fuel
DIVERSION: 200 miles.

	Time mins.	Distance miles	Fuel lbs.
Cruising at 17,500 ft. :—			
Climb from 5,000 ft. to 17,500 ft.	14	51	700
Cruise at 17,500 ft. and 320 mph T.A.S.	23	117	970
Descend from 17,500 ft. to 5,000 ft.	7	32	120
TOTALS	44	200	1,790

WEIGHTS

	lbs.
Weight, less fuel, payload, etc.	34,844
Fuel for distance	6,395
Total Reserves	3,730
Oil	144
Payload	13,156
TAKE-OFF WEIGHT	58,269

LANDING WEIGHT ..... 51,874 lbs.
"ZERO FUEL" WEIGHT ..... 48,000 lbs.
PAYLOAD ..... 13,156 lbs.
Payload limited by "Zero Fuel" weight

CHICAGO-NEW YORK FLIGHT PLAN for the Viscount 700 is based on the standard 40- to 48-seat layout with a flight crew of two and two cabin attendants. Turboprop transports will be seen regularly at both New York and Chicago when TCA puts its 15 Viscounts into operation. Deliveries are scheduled to start in the fall of 1954.

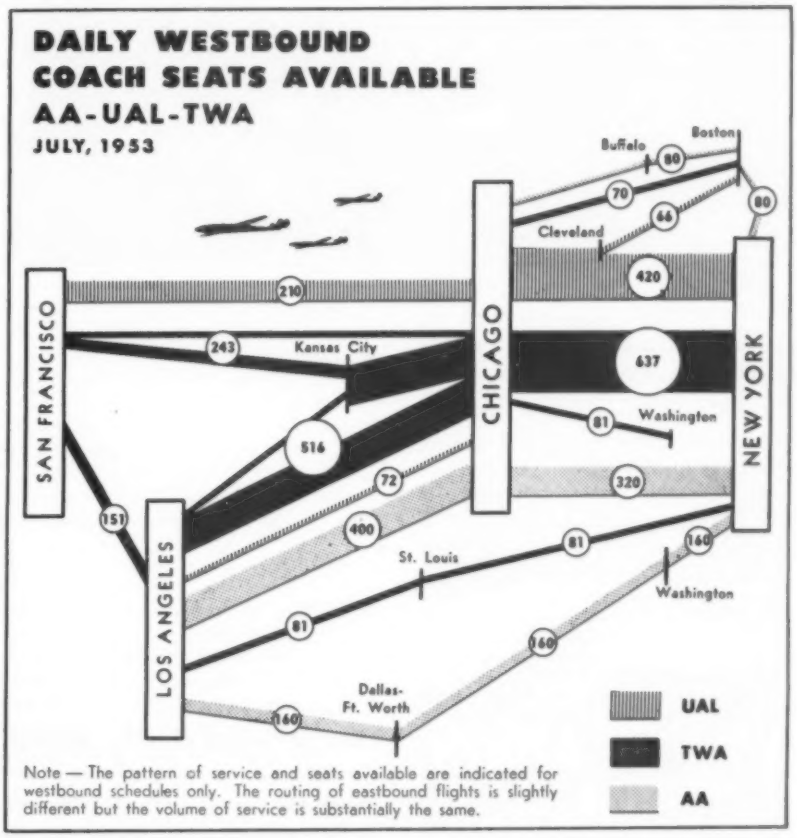
Engine maintenance labor: ¼ man-hour/engine hour	1.00	2.00
material	..	0.14
3¢ per engine-hour labor	2.5	5.00
Engine overhaul material	..	21.00
Propeller maintenance and overhaul	..	..
Totals	7.85	36.84

Crew Cost	Dollar per flying hour
Captain and co-pilot	23.60
Travel and incidentals	1.75
Total fixed cost per hour	104.04

In the accompanying flight plan for operation of the Viscount 700 between Chicago and New York the study is based on a maximum take-off weight of 58,500 pounds, a maximum landing weight of 52,000 pounds, a maximum "zero fuel" weight of 48,000 pounds, and a total fuel tankage of 2065 U.S. gallons (further internal tankage may be fitted to bring the total up to 2350 gallons for long-distance operations).

The flight is considered against an average wind strength of 10 mph and allowances for landing and take-off, one hour holding on three engines at 1.2V *min. power* at 500 feet above destination, and for a 200-mile diversion from holding altitude are made. Further fuel burned before the take-off does not affect the payload as it may be added above the maximum gross weight.

• • •



Note — The pattern of service and seats available are indicated for westbound schedules only. The routing of eastbound flights is slightly different but the volume of service is substantially the same.

Scope of coach service provided by three major carriers is illustrated by the diagram above. Figures in circles show numbers of seats; thickness of lines is in relation to number of flights. Westbound seats daily out of New York: 1618; Boston to Chicago: 216; Chicago to San Francisco and Los Angeles: 1441.

Field ambulance YH-31 helicopters are shown as they near the end of the production cycle at Doman Helicopters, Inc., Danbury, Conn. The YH-31 is currently undergoing CAA type certification. The commercial version, known as the LZ-5, has a useful load of 2140 pounds, almost 600 pounds more than the YH-31.

Not cannon, but ominous-looking jet engines line up at General Electric's Lockland, Ohio, jet center. Afterburners, facing the camera, are attached to J-47-GE-17's. Engine powers the North American F-86D, all-weather interceptor.

Production Lines

Like a small ferris wheel, this jig rotates, speeding assembly of belt frames for Convair 340's. The idea was an employe suggestion. During the past seven months such suggestions have saved Convair's San Diego division approximately $1.5 million.

West Coast Talk

By Fred S. Hunter

New weights for the Douglas DC-7 are scheduled to be as follows:

	New	Old
Maximum take-off	123,500 lbs.	122,200 lbs.
Zero fuel weight	96,000 lbs.	90,250 lbs.
Landing weight	102,000 lbs.	97,000 lbs.

Result of this growth will be a payload increase of approximately 5000 pounds, up from 20,000 to 25,000 pounds. The payoff at the cash register will come when the plane goes high-density. It will then be able to carry up to 96 passengers in a coach configuration plus approximately 4500 pounds of cargo. This undoubtedly will add to the craft's useful life irrespective of turbojet or turboprop developments.

• •

Remember the engineering committee North American Aviation had studying prospects for a jet transport, a feeder-line plane, and an executive? It was side-tracked a while back for studies on a more pressing Navy project. The committee's findings before the switch, incidentally, are said to have tended toward the executive as the best bet. The feeder plane was dismissed quickly because of the small market; perhaps less than 100 planes. Its expensive economics made the jet transport appear unattractive. Whether the North American engineers considered only a commercial executive or had some military ideas in mind is open to conjecture, but the latter is a good guess. The Defense Department's budget reduction in support-type aircraft, however, would appear to make prospects pretty slim in this direction right now—and may be the reason the committee is engaged along other lines at the moment.

• •

Aircraft production people who get the opportunity to inspect Convair's new Pomona plant come away green with envy. They say it's a gem; easily the finest facility in the west. It's been hand-tailored for guided missile production and the ultra-modern machine tooling alone is reported to represent an investment of approximately $37,500,000, counting both procurement and installation costs. Industry sources also indicate the Terrior, the anti-aircraft missile Convair is to produce for the Navy, is really a good one. Convair is behind schedule at Pomona, because of construction and other delays, and the company also has had a series of organizational difficulties in the division. These now are believed to have been straightened out. Charles F. Horne, former CAA administrator, took over as division manager last month, and the production outlook is regarded as being substantially improved.

• •

No news travels faster, apparently, than word of a forthcoming delivery flight by a foreign carrier. Ask any foreign carrier representative, or any Douglas or Lockheed executive: they're driven crazy by requests for free rides. Even people without the remotest connection either with aircraft manufacture or with air transportation are on the phone immediately the word gets out that KLM or Air France or one of the other European carriers is dead-heading a new ship to New York.

• •

Ed Heinemann, chief engineer of Douglas El Segundo, still thinks too little attention is being paid to airports. Ed points out that engineers have found no way to change the ratio of low speeds and high speeds. Landing speeds increase, too, and the only solution is to let the airports grow. "One of the cheapest ways to buy safety is to have an adequate airport," is the way Ed puts it.

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NORTHWESTERN AERONAUTICAL COMPANY
Holman Field, St. Paul, Minnesota

AIRWORK CORPORATION
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PACIFIC AIRMOTIVE CORPORATION
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Linden, New Jersey

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VERSATILITY IS KEYNOTE of Mene Grande DC-3A, which can carry cargo and/or passengers. Ten two-place Burns seats fold and secure against sidewalls and collapsible bulkheads (seen folded, foreground) separate passenger area from cargo when both are being carried.

Cargo Hauls Boost Corporate Plane Use

Conversions from top brass to fast freight increase value of aircraft investment for some firms.

By Lois C. Philmus

EXECUTIVE AIRCRAFT have come to be associated with "glamour"—beautifully furnished cabins complete with bars, desks, reclining chairs, couches—all aimed at making the planes' passengers even more comfortable than in their own offices. But certain corporation aircraft operators find the need for "workhorses," stripped of glamor but appointed for maximum utility to serve, not only for carrying passengers, but for hauling cargo.

To meet this need, Mene Grande Oil Co. of Venezuela recently turned its DC-3A over to Southwest Airmotive at Love Field, Dallas, to be converted for both rugged cargo duty and passenger carrying. Mene Grande pilot V. (Red) Irwin worked out the specifications for the conversion.

Ten two-place Burns seats were installed to provide 20-passenger capacity. The seats are folded up and secured against the sidewalls when the plane is needed for cargo carrying. To serve the dual purpose, bulkheads which can be collapsed and folded were installed in order to separate the passenger area from the cargo.

The cabin floor is made up of three ⅜" thicknesses of marine plywood glued together and covered with brown cork linoleum. Cargo screws, consisting of five rows of Wedjit plates, extend down the length of the floor.

Headliner and upper sidewalls were upholstered over two inches of fiberglass insulation with five-ounce brown duck; lower sidewalls are of metal. Horizontally, behind the sidewall upholstery, the hardware for the foldup seats has been fastened to aluminum stringers.

The tops of the collapsible bulkheads are constructed of plexiglass which can be folded down when the cabin is cleared for cargo. The floor lock is released and the bulkhead is folded back and fastened against the sidewall. The bottom portion was constructed of plywood and is covered in plastic for durability.

Another innovation is a stainless steel and aluminum galley designed by Southwest, which can be unbolted and lifted out of the plane by handles on either side when not needed. The unit consists of storage bins, icebox, and two one-gallon bottles.

To complete the conversion for maximum utility, SAC installed new controls in the panel and a new generator system on Mene Grande's DC-3A. Barber-Colman automatic cabin heat controls and a rotating tail beacon completed the changeover.

The Mall Tool Co. of Chicago is another corporate aircraft user that believes in versatility for its aircraft. Although cargo carrying represents a very small portion of its fleet's chores, a certain amount of cargo has had to be airlifted during emergencies.

Mall's fleet consists of two Twin Beechcrafts, a Navion and a Seabee. The two Beeches are used for trouble shooting. The planes can be stripped of passenger seats quickly and can carry, when necessary, up to 1,000 pounds of freight for a 1,000-mile range.

Served During Strike

At one time, during a railroad strike, Mall's production line was threatened with a close-down if its stock of treated aluminum die castings was not replenished. The problem was to speed them from New York to the plant, located 30 miles outside of Chicago. A Beechcraft was immediately put into service. Within less than 24 hours untreated castings were flown to N. Y. and the plane returned to Mall's airport with 1,000 pounds of aluminum die castings, treated and ready for use.

Beeches also are pressed into service so that Mall can fly its new products to areas in the U.S. where they can be given complete tests with experimental engines. This means, for example, that Mall chain saws can be flown to the northern sections of Wisconsin and Michigan, where full tests can be run without subjecting populated areas to the noise involved.

Freight hauling is gaining more importance among business aircraft owners, who are beginning to find that there is greater utilization to be had from this new business tool than just the transportation of executives and other key personnel. The above examples indicate the variety of uses that companies can find for their aircraft investment.

• • •

Atlantic Cargo Down 14% in Five Months

Uncertainty as to Congressional action on tariffs and trade agreements is viewed by industry observers as primary cause for current 14% drop below last year's North Atlantic eastbound and westbound air cargo traffic.

In first five months of 1953 IATA member carriers hauled 1,397,000 kilos of cargo, as opposed to 1,509,000 kilos for the same period in 1952. Scandinavian Airlines System late in June suspended its scheduled all-cargo DC-4 flights between the U.S. and Europe.

This "Program" Keeps the TV Industry on schedule!

How American Airfreight has improved production for leading electronic manufacturers

To keep assembly lines flowing smoothly, the nation's television industry today specifies airfreight delivery on incoming shipments from distant suppliers. Thus component parts are on hand in the factory when needed and production schedules are promptly met.

What's more, such an airfreight "program" permits more rapid introduction of set improvements—and at the same time eliminates heavy obsolescence costs on component parts that would otherwise be in stock for the discontinued models.

Speak to any of the leading electronic manufacturers—and they'll tell you that the production flexibility resulting from airfreight more than compensates for slightly higher shipping charges. For further information on what American Airfreight can do to improve your business, wire us *collect*—and we'll have a representative in your office promptly. American Airlines, Cargo Sales Division, 100 Park Ave., New York 17, N. Y.

AMERICAN AIRLINES INC.

America's Leading Airline

Leadership Demands Constant Achievement

Lockheed's huge Marietta, Georgia, factory speeds output of U.S. aircraft

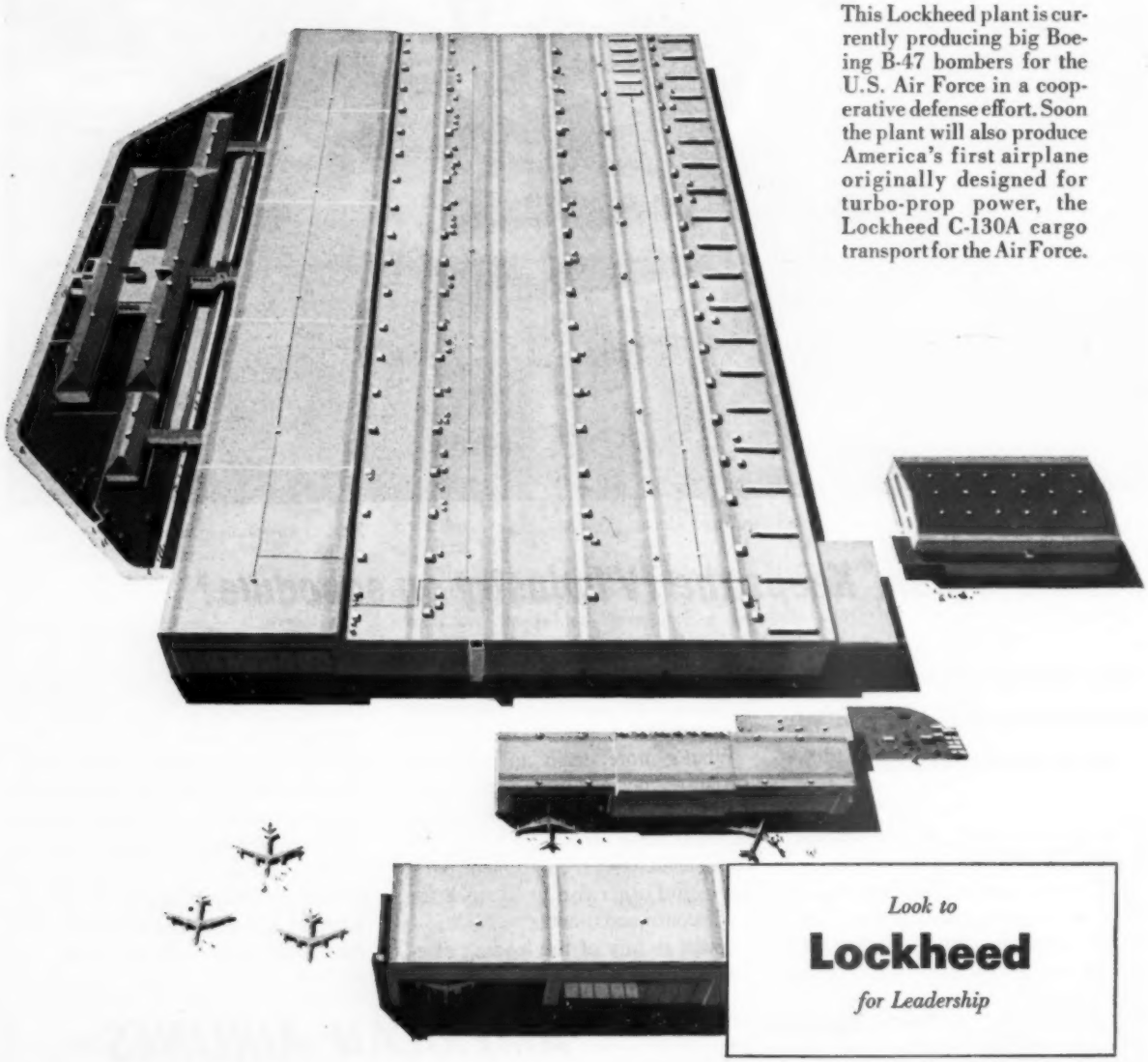
EXPANDS DEFENSE PRODUCTION IN INDUSTRIAL SOUTH

Lockheed and the growing Industrial South today provide the U.S. with one of the world's largest aircraft factories—Lockheed's huge Marietta, Georgia, plant.

A short distance from Atlanta, this factory complements Lockheed's California Division, providing the industrial dispersal now considered vital to U.S. defense.

Lockheed's Georgia Division employs over 13,000 people and has an $800 million backlog of plane orders. That's big business—and an excellent example of new production in the fast-growing Industrial South.

This Lockheed plant is currently producing big Boeing B-47 bombers for the U.S. Air Force in a cooperative defense effort. Soon the plant will also produce America's first airplane originally designed for turbo-prop power, the Lockheed C-130A cargo transport for the Air Force.



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Lockheed

C-130A Transport—One Plane for 3 Jobs

Soon in production at Lockheed's Marietta, Georgia, plant, the U.S. Air Force's new turbo-prop transport, the Lockheed C-130A, will fly higher and faster than any other military transport and perform a great variety of missions.

The C-130A is the first transport specifically designed for turbo-prop engines, which harness jet power to propellers.

Air Force Competition Winner

Winner of an industry-wide Air Force design competition, the C-130A transport will perform three different jobs:

1. Carry soldiers, paratroops, patients and all types of ground force equipment up to items weighing twelve to twenty tons.
2. Fly high-altitude, high-speed missions as a tactical airplane for the Air Force.
3. Transport passengers on long-range flights for the Air Transport Command.

Unique Construction

The C-130A has a floor as strong as a concrete warehouse floor a foot thick. Its fuselage is only 45 inches off the ground—level with truck-bed height for easier loading and unloading. The pressurized cabin permits ground-level comfort for military personnel at high altitudes.

Of special importance to the Air Force, the new transport will require only short take-off and landing runs. Special tandem-wheel tricycle landing gear permits it to use emergency landing fields in forward areas, or even unfinished air strips.

Prototypes of the airplane are nearing completion at Lockheed's Burbank, Calif., plant. The plane will go into quantity production at Lockheed's Georgia Division, in Marietta, where giant B-47 jet bombers are currently being built.

Extra Section

By William V. Henzey

"Extra Section" is now being written by each of the members of the staff, in turn, to bring you highlights from all phases of the industry.

CAB MEMBERS sometimes reel under Congressional criticism, sometimes burn inwardly, but rarely see a humorous side as they did recently when Senator Wayne L. Morse quipped on the Senate floor: "The CAB is the greatest drag on aviation since gravity."

• •

For fifteen years the men who have agreed to serve for $15,000 a year as Board Members have been subjected to Congressional criticism in varying degrees. During that period, nine different individuals have served as chairman, but fortunately were not dependent upon longevity pay, as only two have lasted longer than the 20-month average—L. Welch Pogue (4½ years) and Joseph J. O'Connell, Jr. (2¼ years).

• •

In all, there have been 19 men who have served as CAB Members, with only one, Oswald Ryan, present chairman, on the Board since its creation in 1938. Although memberships are for six-year periods, the average life of a member is four years, with only five men serving longer than that: Ryan (13 years); Josh Lee (10 years); Harllee Branch (nine years, nine months); Edward P. Warner (six years, four months); and Pogue (4½ years).

• •

The distinction of serving for the shortest period of time goes to Delos W. Rentzel, who lasted seven months and then jumped to a top spot in the Commerce Department as Undersecretary of Commerce for Transportation. Before Rentzel, the record for brevity was held by Edward J. Noble, the Lifesaver magnate, who served as the Board's first chairman, lasting eight months.

• •

Incidentally, the term of office being filled now by Vice-Chairman Harmar D. Denny had, since 1942, been filled only by chairmen. Pogue first served under it, to be followed in order by Landis, O'Connell, Rentzel, and Donald W. Nyrop. The last three named and Denny have all served during the current six-year running of the term, which expires December 31, 1953.

• •

There have been 13 periods during the Board's existence when it functioned with less than its full quota of five members because of vacancies, but the longest such period was the most recent five-month stint between the resignation of Nyrop and the appointment of Denny. Similarly, there have been six periods when operations were necessary without a designated chairman, with the longest being a three-month spread between the terms of Landis and O'Connell.

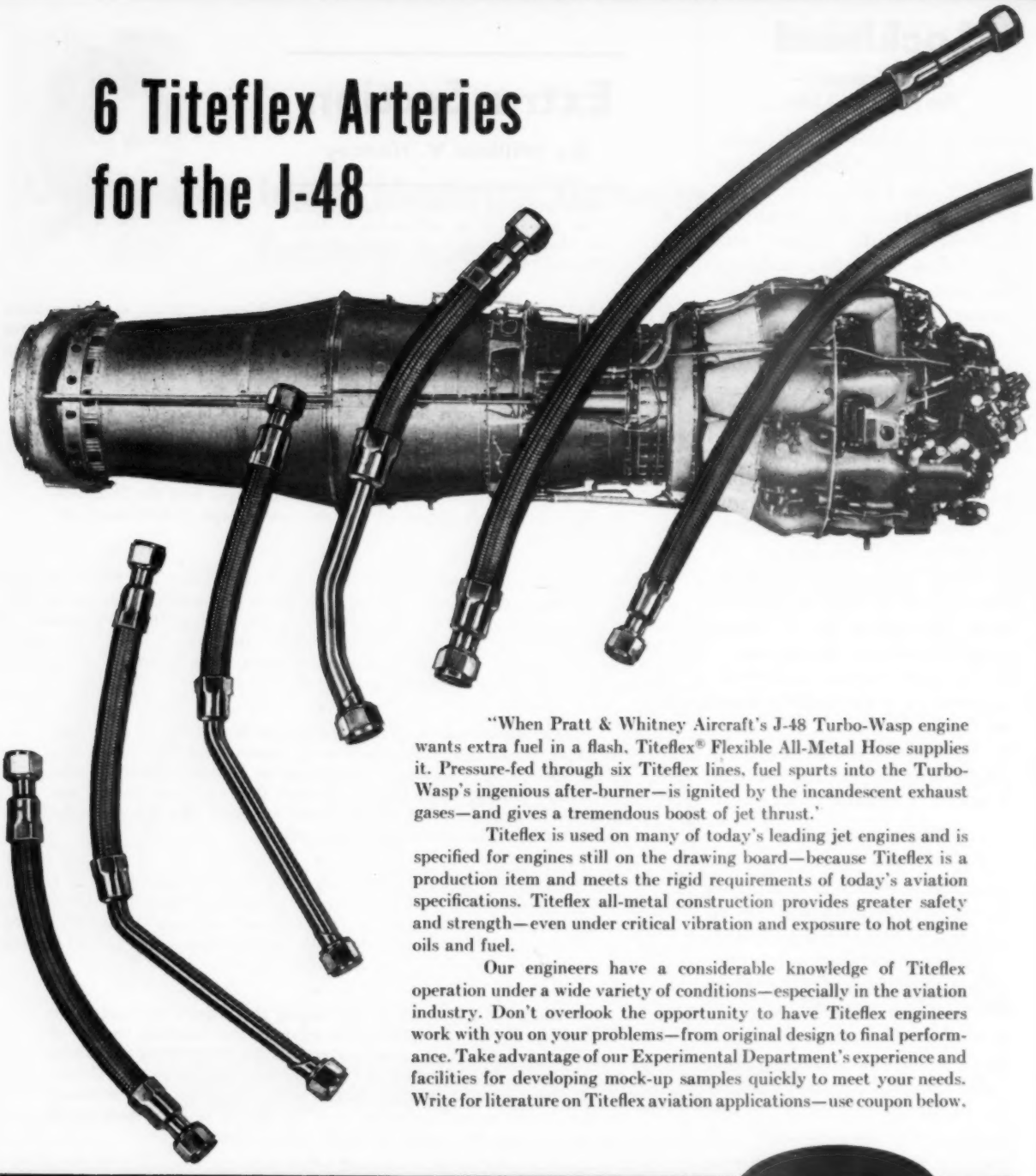
• •

Board members are nominated by the President but must be confirmed by the Senate. Terms of office originally were for staggered periods to avoid termination of more than one member's term in any one year. Thus, for the present Board, the situation has resolved itself so that Denny's term expires this year, Ryan's next year, Lee's in 1955, Adams' in 1956, and Gurney's in 1958. Once every six years is a "free ride," with no expiration in 1957.

• •

Each Board Member has an assistant, little heard of, but prominent in every action taken by the agency. Deans of the present staff are: (1) Fred Davis, who has served Harllee Branch, Harold A. Jones, and Chan Gurney, and (2) Ross Newman, assistant for years to Josh Lee. Warren Baker, of Ryan's office, and Vern Radcliffe of Denny's, are former trial examiners, and Gil Bates, assistant to Joseph P. Adams, is a former mail rate expert of the Board.

6 Titeflex Arteries for the J-48



"When Pratt & Whitney Aircraft's J-48 Turbo-Wasp engine wants extra fuel in a flash, Titeflex® Flexible All-Metal Hose supplies it. Pressure-fed through six Titeflex lines, fuel spurts into the Turbo-Wasp's ingenious after-burner—is ignited by the incandescent exhaust gases—and gives a tremendous boost of jet thrust.'

Titeflex is used on many of today's leading jet engines and is specified for engines still on the drawing board—because Titeflex is a production item and meets the rigid requirements of today's aviation specifications. Titeflex all-metal construction provides greater safety and strength—even under critical vibration and exposure to hot engine oils and fuel.

Our engineers have a considerable knowledge of Titeflex operation under a wide variety of conditions—especially in the aviation industry. Don't overlook the opportunity to have Titeflex engineers work with you on your problems—from original design to final performance. Take advantage of our Experimental Department's experience and facilities for developing mock-up samples quickly to meet your needs. Write for literature on Titeflex aviation applications—use coupon below.

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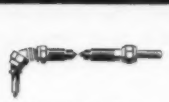
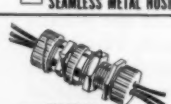


☐ IGNITION SHIELDING



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Maintenance Bulletin Board

KLM's Experience with Tire Recapping

AIRCRAFT TIRE LIFE analyzed by KLM Royal Dutch Airlines presents a comprehensive picture of experience with new and recapped tires for main landing gear installations on Constellation, DC-6, and Convair 240 aircraft. Recapping for KLM is contracted to Leeuwarden company of North Holland and data shown represents experience with 2500 tires received since 1949:

New Tires to 1st Recap	Constellation All Goodyear	Douglas DC-6 Various Makes	Convair 240 All Goodyear
Avg number of landings	415	196	213
Maximum	592	315	299
Minimum	304	140	50
Rejected	27%	41%	54%
Avg no. of landings	461	199	197
1st to 2nd Recap			
Avg number of landings	245	233	216
Maximum	269	299	285
Minimum	175	184	175
Rejected—pct of original	36%	9%	22%
Rejected—pct of 1st Recap	50%	13%	60%
Avg no. of landings	269	299	193
2nd to 3rd Recap			
Avg number of landings	134	186	261
Maximum	167	229	323
Minimum	91	78	185
Rejected—pct of original	27%	30%	—
Rejected—pct of 2nd recap	75%	66%	—
Avg no. of landings	—	234	—
3rd Recap			
Avg number of landings	190*	200	—
Grand Total			
Average number of landings	655	461	354
Maximum	952	774	804
Minimum	304	140	50

** One tire served 190 landings on 3rd recap, was recovered and operated another 190 landings on 4th recap.*

Daily Utilization

DOMESTIC

Average Revenue Hours of Use Per Day Per Aircraft
Average for All Types

	Jan.	Feb.	March	April
American	7:19	7:44	7:46	8:13
Braniff	6:36	7:10	6:56	6:06
Capital	7:18	7:40	7:41	8:08
Caribair	5:00	5:00	5:20	4:47
C & S	8:54	9:27	9:21	9:17
Colonial	6:29	7:12	6:49	7:47
Continental	7:02	6:16	6:34	6:42
Delta	8:31	8:17	7:43	8:10
Eastern	8:12	8:26	8:35	8:41
Hawaiian	N.A.	N.A.	N.A.	N.A.
National	8:26	8:48	8:41	8:44
Northeast	5:29	6:24	5:50	6:06
Northwest	8:03	8:27	8:35	9:13
Trans Pacific	5:42	5:27	5:29	5:40
TWA	5:57	6:18	6:20	6:41
United	6:24	6:27	6:36	6:39
Western	6:57	6:46	7:14	7:07

N.A.—Not available

New Test Checks Plastics Distortion

A new inspection method for plastic canopies of Northrop F-89's has raised the acceptance rate to nearly 98%. The system, which is the fruit of nearly two years' work by Northrop plastic engineers, involves a grid system, a three-hole camera, and a projector.

The grid is drawn on a wall, in front of which the canopy is placed. The projector and the camera are placed at the point from which the pilot would ordinarily look through the plastic. In the early stages of inspection the projector throws the image of a second grid on the wall. Points of difference between the two grids reveal distortion in the plastic. In the later stages of testing the camera photographs the wall grid pattern. When the negative is examined it is possible to tell at a glance whether the canopy is acceptable.

Airborne Analyzers To be Installed by EAL

Reduced maintenance delays at en route stations, plus increasing safety and dependability are the goals behind an Eastern Air Lines' $105,000 project calling for installation of Sperry Gyroscope Co. airborne engine analyzers in

HARDMAN...H-D

a new standard of luxury in high density seating!

More roomy comfort, high strength and fine appointments—greater genuine quality—have made Hardman H-D's the pacemaker of the industry, replacing ordinary utility lines. Hardman H-D's are interchangeable with luxury lounge type chairs—no cost increase in adding to passenger lists. Safety *break-away* backs provide maximum emergency footway. Around the world, Hardman H-D's are in service with United Air Lines; Canadian Pacific; Panagra; Trans Canada Airlines; K. L. M.; Swiss Air; Pakistan; S. A. F. E.; Japan Air Lines; Philippine Air Lines; and S. A. S., and others.

HARDMAN
HIGH DENSITY
Seats

HARDMAN TOOL & ENGINEERING CO.
1845 S. Bundy Drive • Los Angeles 25, Calif.

its fleet of 30 Lockheed Super Constellations.

Analyzer installations are already under way at EAL's Miami maintenance base, with the 14 presently operated Constellations due to be equipped by early September. Units will also be installed in the 16 Wright Turbo-Compound powered Constellations which are on order.

FIRST AIRBORNE engine analyzer installation in Eastern Air Lines' Super Constellation is looked over by flight engineer J. Higdon. EAL has ordered 30 units from Sperry Gyroscope Co. at a cost of $105,000 for present and future Constellations.

Flight engineers and line mechanics numbering 200 are being specially trained in the use of the troubleshooting equipment. Eastern's contract with Sperry calls for analyzers, spare parts, flight engineer training assistance, and technical service.

Daily Utilization

Quarter ended Dec. 31, 1952

Local Service Carriers

Allegheny	DC-3	5:05
Bonanza	DC-3	7:44
Braniff	DC-3	6:18
Central	DC-3	6:20
Frontier	DC-3	7:17
Lake Central	DC-3	4:39
Mohawk	DC-3	5:29
North Central	DC-3	5:46
Ozark	DC-3	6:55
Piedmont	DC-3	8:08
Pioneer	2-0-2	6:29
Southern	DC-3	6:42
Southwest	DC-3	6:00
Trans-Texas	DC-3	5:30
West Coast	DC-3	5:56
Wiggins	Cessna T-50	1:57

Northwest Installs Autopilot Coupler

Northwest Airlines has begun installation of Bendix Flight Path Control (radio autopilot coupler) systems in Boeing 377 aircraft. Prototype airplane has been equipped and target for full fleet operation is January, 1954.

System is produced by Bendix Eclipse-Pioneer Division and operates with Bendix PB-10 automatic pilot.

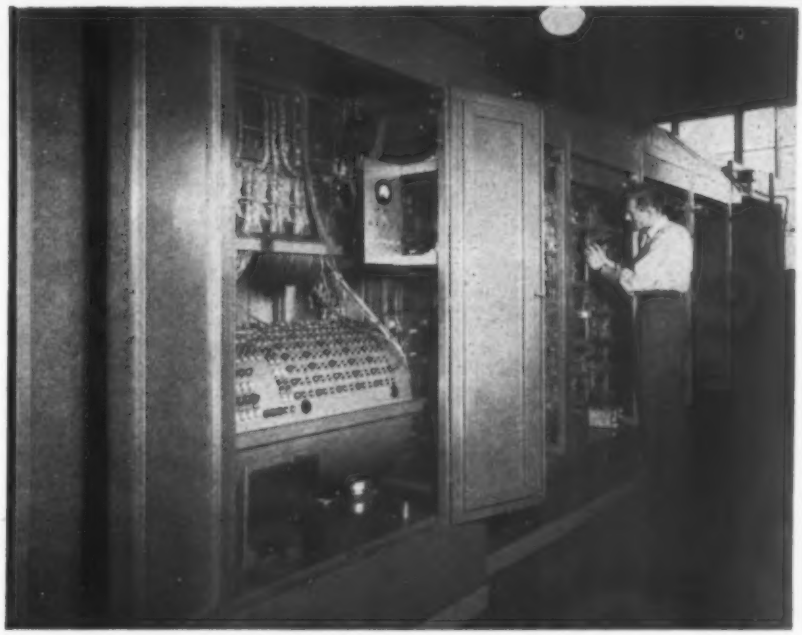
High cost item in airline operation is lost aircraft utilization along with labor and material costs to repair damages inflicted during ground operations. Common offender is fork-lift truck operator as shown in one of a series of National Safety Council safetygraphs on ramp safety (above).

Cause, NSC concludes, is driver's concentration on his clearance of other pieces of ground equipment to the point where he runs into the airplane; or he may just be going too fast to stop in time.

Suggested precautions: (1) look in all directions to be sure of clearance on all sides, (2) drive slowly so you can stop at a moment's notice, and (3) if you are reaching forward, let out clutch smoothly to avoid jackrabbit starts.

New Vent System

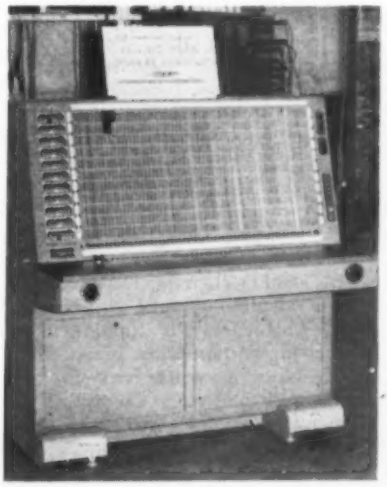
A magneto and distributor vent system for Pratt & Whitney R-2000 engines which forces air into the magnetos and distributors through ½" tubing located on the front section of the engine has been adopted by American Airlines. The air is then released through a drain tube which terminates in the engine's low pressure accessory section.

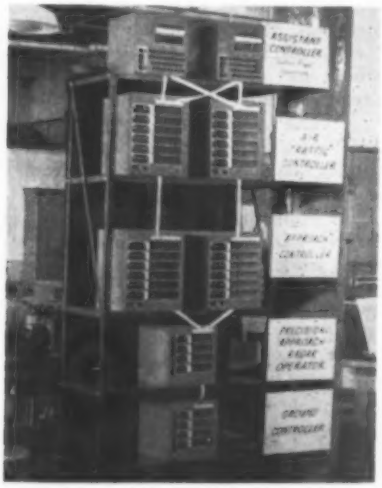


MAGNETIC STORAGE DRUM built by Engineering Research Associates, Minneapolis division of Remington Rand, Inc., will store flight plan data on 2000 aircraft simultaneously. It inspects stored data once every ten minutes, originates teletype messages automatically without human assistance. Speed of operation is demonstrated in its ability to scan the first 18 characters of 2000 separate flight plans in 4/10ths of a second.

New Automatic Control Equipment

Long range air traffic control experimental operations by Air Navigation Development Board begin to take shape, as pictured in these first photos of equipment nearing completion. All are scheduled for installation in new ANDB Airways Operations Evaluation Center in Indianapolis, later this year.





DATA DISPLAY AND TRANSFER BOARDS developed for ANDB by Union Switch & Signal Co., division of Westinghouse Air Brake Co., automatically display flight plan data as airplane flies into control area and handle up to 11 aircraft simultaneously. Smaller displays accommodating fewer aircraft receive data automatically for ready reference by assistant flight controller, air traffic controller, approach controller, precision approach radar operator, and ground controller.

OPERATION OF SYSTEM of "closed loop" traffic control is illustrated above. Signal from control tower brings automatic response from aircraft, identifying it.

Navy to Develop New Radar Beacon

Military system released for civil use will cut traffic delays, give positive plane identification.

By Charles H. Holm
(U. S. Navy)

AT LONG LAST a means of minimizing arrival delays in terminal area air traffic control is on the horizon. With the development of a common system radar safety beacon positive identification and rechecking of aircraft becomes a reality. The facts are these:

- **The Joint Communications-Electronics Committee** of the joint Chiefs of Staff has recently released to the Air Navigation Development Board specifications for an unclassified radar safety beacon system.
- **The ANDB has requested** that the Navy's Bureaus of Ships and Aeronautics develop and test both ground and airborne equipment.
- **Funds have been transferred** to the Navy from the ANDB and development work has begun.
- **Developmental units** should be available for test at the Patuxent River Naval Test Center in the early fall.
- **The beacon will incorporate** features which will make it operationally compatible for terminal area traffic control equipment also to be used by the military.

Operators of both civil air carrier and military aircraft as well as those directly concerned with air traffic control have long recognized a severe limitation imposed on control of air traffic in terminal areas. This limitation is the lack of a means of identifying individual aircraft rapidly and positively. It is particularly emphasized in areas where radar air traffic control is being operated, such as Washington National and New York LaGuardia airports.

Authorities have long advocated the use of a radar beacon system which would effect compatibility with both civil and military equipment. Some compatibility would expedite the control of both military and civil air traffic in a terminal area.

Operation of this system will be predicated upon the familiar "closed loop" concept, in that the airborne equipment will be triggered by the terminal ground-based equipment, and will in turn transmit a reply. Both will operate in the 1000-megacycle region.

The ground equipment installed at the terminal transmits, at the will of the traffic controller, pulses of radio frequency energy. The airborne transponder unit decodes these pulses, and replies, at the discretion of the pilot, with an identifying pulse or series of pulses. This energy is transmitted to the receiving portion of the ground unit, and is in turn presented on the traffic control radar indicators. Control of the transponder may be interlocked with the pilot's communication controls.

The radar traffic controller can then, by observing the beacon response when receiving a radio call for instructions from an incoming aircraft, immediately identify it without directing delaying turns or changes of course.

Cost of the equipment is not firm at this time, but realiable sources estimate that the airborne equipment would run in the neighborhood of $1500, and would weigh forty pounds. In production quantities cost would be reduced, and design goals are a reduction in cost to $200 and in weight to 20 pounds.

Implications of the result of this development are plain:

- **Positive identification** in the terminal area will practically eliminate holding delays.
- **Compatibility** with military system will make positive, safe control of both civil and military traffic possible in a terminal area.
- **The beacon** will increase the effective range of the traffic control radar by roughly 100% and will greatly minimize radar coverage limitations caused by precipitation.
- **Reduction of arrival delays** will offset the cost of equipment in a short time.
- **The system may also** be used with radar-controlled departures and further reduce separations. • • •

Allison Denies Charges Of Engine Delays

E. B. Newill, general manager of Allison-Aeroproducts Division, General Motors Corp., has flatly denied charges made by Sen. Stuart Symington (D., Mo.) on the Senate floor that the company was behind schedule in building engines during World War II and is still causing delays.

In a letter to Indiana's two Republican Senators, Homer Capehart and William Jenner, Newill pointed out that Symington, while Air Secretary, gave Allison a citation for delivering 70,000 liquid-cooled V1710 engines during the war.

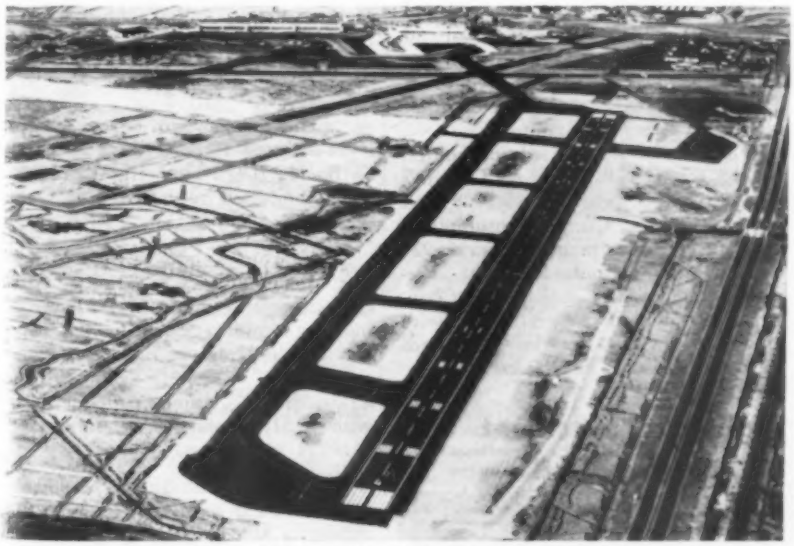
Allison was three engines behind schedule in 1939 and 277 in late 1940, but had made up the deficiencies by the end of 1941 and delivered 76 more than had been called for, Newill said, adding: "During the rest of the war years we stayed on or ahead of schedule and met all our commitments substantially on time. Our total wartime production of these engines was more than 70,000."

Allison is now "on or ahead of schedule in all our deliveries of turbojet engines, representing 98% of our engine commitments," he stated. The two per cent in which the company is behind involves "starting of production of new development programs in turboprop engines," powerplants which until now have not been mass produced in the U. S., "or, to the best of our information, in any other country."

MAIN ENTRANCE of new terminal at Newark. Building cost $8.5 million.

Newark Gets New Terminal, New Runway

NEW BUILDING, center, contains five times the area of old one, left, which will be used for air mail and express. In background, runway 4-22.



NEW RUNWAY, which cost $9 million, is designed for instrument operations with latest equipment. U-shaped ramp of new terminal is visible in background. Seven turn-off taxiways speed clearance of runway.

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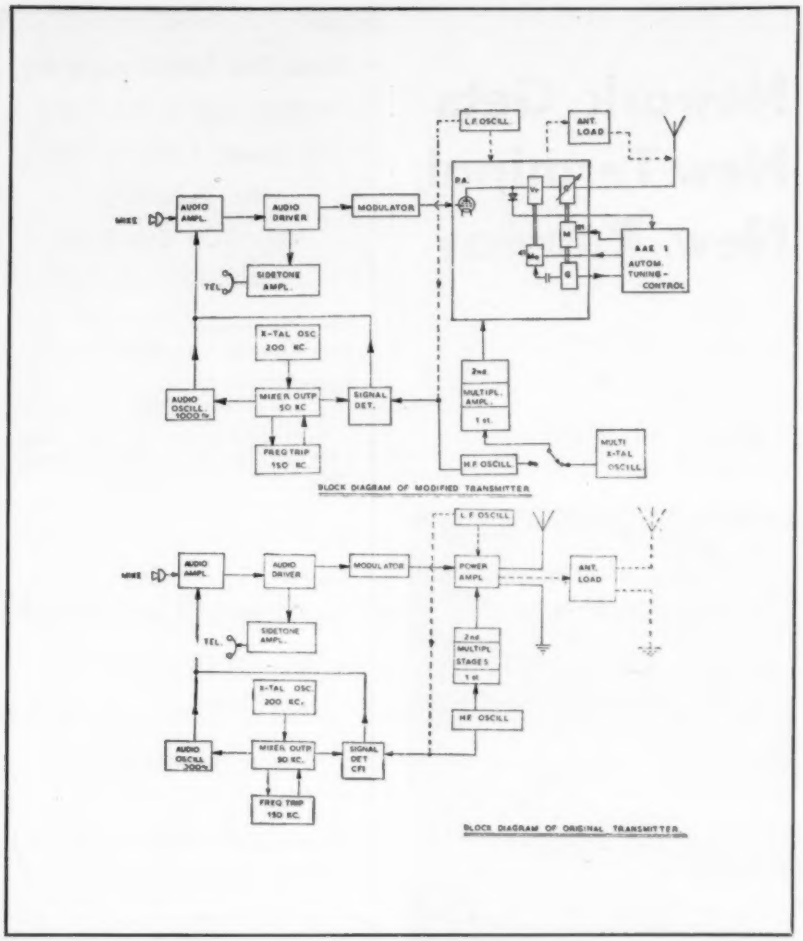


KLM Modifies Sets to 107 Channels

KLM Royal Dutch Airlines has designed a modification of the Collins Radio Co. model ART/13 high frequency communications transmitter which provides a multi-channel HF installation well suited to its world-wide operation at a cost said to be considerably below that necessary to accomplish the same end result by procuring new equipment.

The KLM version of the 11 channel ART/13, now being installed in all of its aircraft operated in international service, is a 107 channel unit with crystal-controlled automatic tuning, at a weight penalty of only five pounds for the new units added. It involves these major changes (see old versus new diagrams):

• **Multi-crystal controlled oscillator**—developed from the original variable frequency oscillator in the ART/13, now contains 107 crystals mounted on eleven strips.

• **Power amplifier stage**—is modified to include a rectifier, variometer turning motor, 90° phase shift capacitor and motor generator.

• **Automatic tuning system**—new electronically controlled unit designed by KLM is remotely operated from a selector switch on the control panel and provides an indicator light to signal end of tuning cycle. By simple switch operation the ART/13 can be used in its original 11 channel set up in event of multi-crystal oscillator failure.

Ratings of the revised transmitter, which KLM calls the ART/13-T47 (M107) are: Voltage supply: 28 volt dc; 1150 volt dc. Current consumption: 29 amperes. Power input: 812 watts; 924 watts. Power output: 90 watts. Frequency range: 2-18 megacycles. Channels: 107 within eleven bands with 4-10% bandwidth. Weight: 80 pounds plus 5 pounds for new units.

Non-Fatal Accident Reports by CAB

CAB has issued reports on two non-fatal accidents involving Lockheed 1049 Super Constellations, finding that:

• **Eastern Air Lines'** accident at Chicago's Midway Airport on March 3, 1953, was probably caused by improperly executed approach resulting in excessive speed and a landing too far down the runway to permit normal stopping.

Regarding landing gear retraction after landing, CAB said it was "difficult to reconcile the crew's statements with what actually occurred," adding that "it appears that in this case the landing gear control lever must have been raised by some member of the crew."

• **TWA accident** at Fallon, Nev., on December 7, 1952, was probably caused by improper use of the emergency braking system during emergency landing necessitated by complete loss of power from No. 3 and 4 engines due to failure of cam drive gears. Contributing factor was inadequacy of company's Lockheed 1049 transition training program from the former model aircraft concerning difference in emergency procedures, CAB said.

NEWS BRIEFS

Stanley Gewirtz has been named assistant to Emory S. Land, president of Air Transport Association. He will study legislative problems affecting the scheduled air transport industry. Gewirtz, who has been practicing law in Salt Lake City, was assistant to James M. Landis, former CAB chairman.

• •

Havana-New York route will be opened in late fall or early winter by Compania Cubana de Aviacion. Company also plans to start Havana-Merida-Mexico City. Constellations acquired from Pan American World Airways will be used on both routes.

• •

Experiments with conversion of Ryan-designed **external wing fuel tanks** on Boeing B-47's into **cargo carriers** are being conducted by the Air Force.

• •

Manufacturers have a **lower injury rate than airlines,** National Safety Council figures show. In 1952, aircraft industry's injury frequency rate (number of disabling injuries per million man-hours) was 4.21, against 8.4 for all industries. Airlines ended the year with 15.31, considerably above average.

• •

Air Research and Development Command has started, at Arcata, Calif., airport, a 60-day **study of extreme fog condition.** During August and September, turbulence processes will be studied in Nebraska.

New Submarine Chaser

A turboprop-powered submarine chaser has been developed by Short Brothers & Harland, Ltd., of Belfast, Northern Ireland, and will start flight tests soon. Aircraft will be powered by an Armstrong-Siddeley (single) Mamba turboprop engine, and will cruise at about 300 mph. First showing is said to be slated for SBAC Farnborough show in September.

1952 Airline Salaries

Following are 1952 salaries as reported by the Alaskan air carriers to the Civil Aeronautics Board:

Byers Airways

Robert D. Byers, partner, $12,000 salary; **Gladys Byers,** partner, $3,400 salary (down $800).

Cordova Air Service, Inc.

Merle K. Smith, pres., $12,000 salary; **Eugene L. Magers,** secy., $8,400 salary.

Ellis Air Lines

R. E. Ellis, pres., $13,800 salary; **J. R. Sherman,** v.p., $11,700 salary (up $831.25); **N. T. Gerde,** secy.-treas., $11,700 salary (up $600); **G. A. Bodding,** chief pilot, $12,600 salary (up $600); **W. A. Nebel,** dir., $10,200 salary (up $900).

Northern Consolidated Airlines, Inc.

Raymond I. Petersen, pres., treas., and dir., $18,000 salary (up $1,000); **R. J. Stevenson,** v.p. and dir., $13,698 salary (down $1,369); **Victor R. Davis,** secy. and dir., $9,600 salary (up $2,100); **Marie A. Petersen,** asst. secy., $1,800 salary; **John A. Walatka,** dir., $11,820 salary (up $1,416).

Pacific Northern Airlines, Inc.

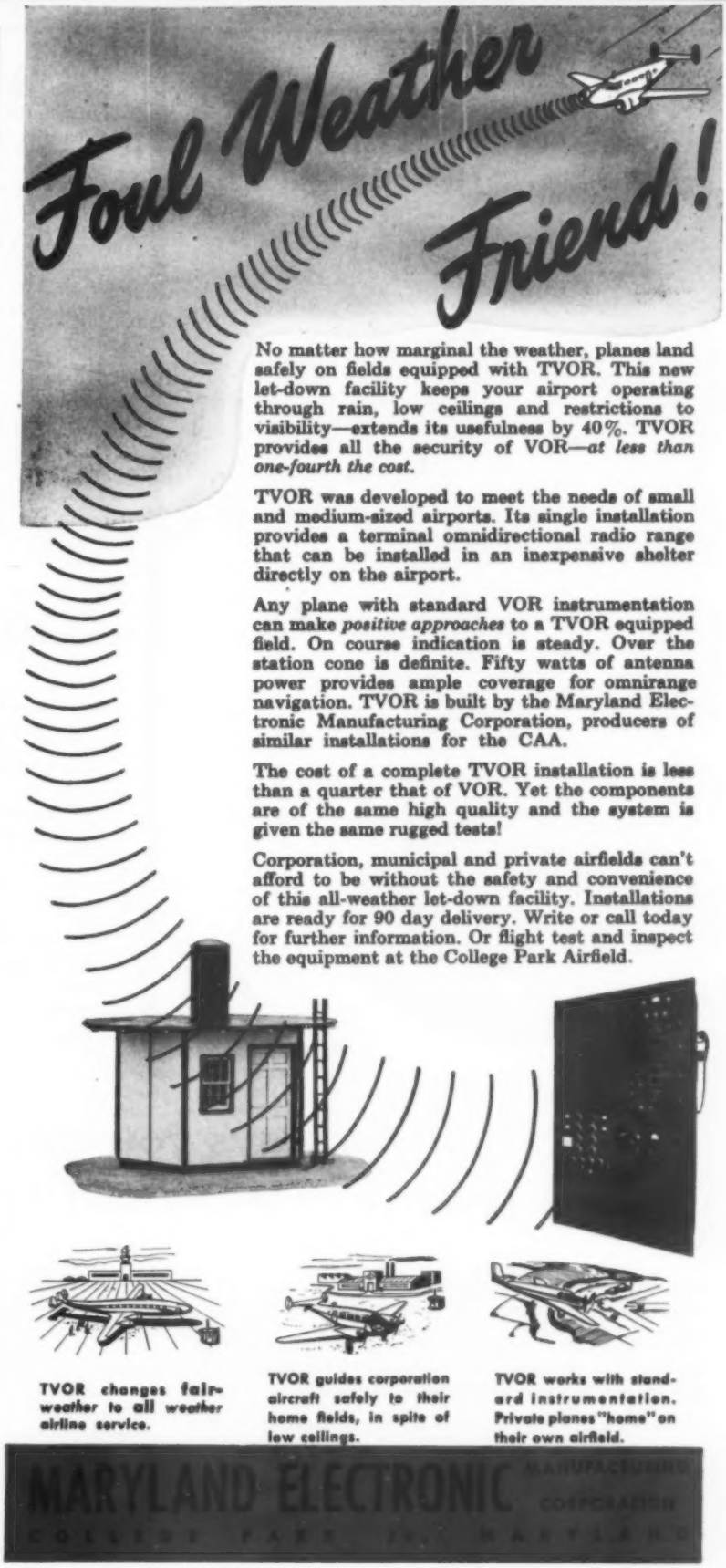
A. G. Woodley, pres. and dir., $25,000 salary; **C. A. Du Rose,** v.p., operations, $10,000 salary; **H. A. Olsen,** v.p., traffic and sales, $9,225 salary (up $525); **C. W. Nelson,** secy.-treas., $8,375 salary (up $875); **D. B. Hart,** asst. secy., $6,700 salary (up $1,100); **M. E. Diamond,** asst. secy., $7,200 salary; **Gerald P. O'Grady,** dir., $18,000 salary (up $7,500).

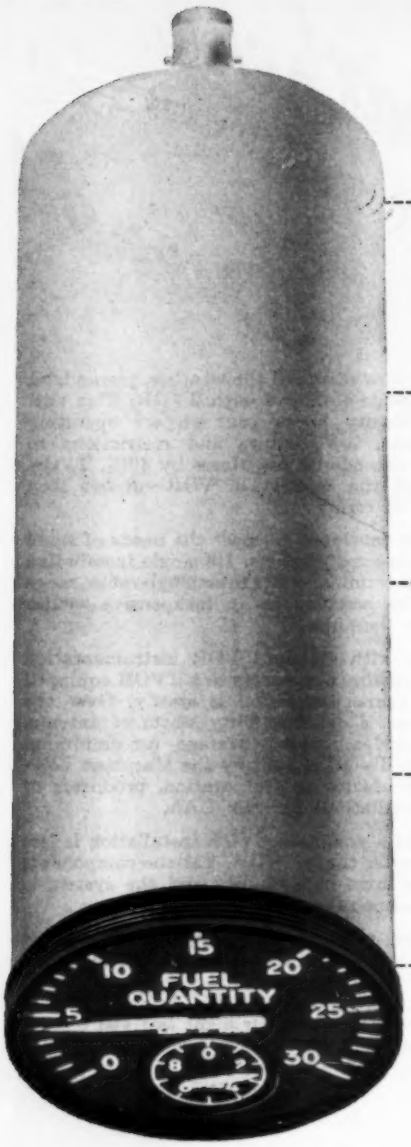
Reeve Aleutian Airways, Inc.

Robert C. Reeve, pres., $24,000 salary; **Robert L. Hanson,** v.p., $9,600 salary; **Margaret Rutledge,** secy. and comptroller, $7,500 salary; **Janice M. Reeve,** treas., no salary.

Wien Alaska Airlines, Inc.

Sigurd Wien, pres., gen. mgr., and chairman of board, $15,000 salary (up $500); **George B. Rayburn,** exec. v.p. and treas., $12,000 salary (up $2,400); **Fritz Wien,** v.p., operations and dir., $11,600 salary (up $2,000); **J. P. Whaley,** v.p., traffic, $11,600 salary (up $2,000); **Noel Wien,** dir., $10,620 salary (as pilot up $1,415); **R. B. Webb,** asst. secy., asst. operations mgr. and dir., $11,600 salary (up $3,907.76); **Antonio Polet,** secy. and dir., no salary.


Foul Weather Friend!
No matter how marginal the weather, planes land safely on fields equipped with TVOR. This new let-down facility keeps your airport operating through rain, low ceilings and restrictions to visibility—extends its usefulness by 40%. TVOR provides all the security of VOR—at less than one-fourth the cost.
TVOR was developed to meet the needs of small and medium-sized airports. Its single installation provides a terminal omnidirectional radio range that can be installed in an inexpensive shelter directly on the airport.
Any plane with standard VOR instrumentation can make positive approaches to a TVOR equipped field. On course indication is steady. Over the station cone is definite. Fifty watts of antenna power provides ample coverage for omnirange navigation. TVOR is built by the Maryland Electronic Manufacturing Corporation, producers of similar installations for the CAA.
The cost of a complete TVOR installation is less than a quarter that of VOR. Yet the components are of the same high quality and the system is given the same rugged tests!
Corporation, municipal and private airfields can't afford to be without the safety and convenience of this all-weather let-down facility. Installations are ready for 90 day delivery. Write or call today for further information. Or flight test and inspect the equipment at the College Park Airfield.
TVOR changes fair-weather to all weather airline service.
TVOR guides corporation aircraft safely to their home fields, in spite of low ceilings.
TVOR works with standard instrumentation. Private planes "home" on their own airfield.
MARYLAND ELECTRONIC MANUFACTURING CORPORATION
COLLEGE PARK MARYLAND



1

IT COSTS LESS. This "repackaging" of Avien's fuel gaging system brings the purchase price to a new low. The system is reduced to a sensing unit and an indicating unit, eliminating the bulky and expensive intermediary unit.

2

IT'S 50% LIGHTER. Lightness always brings cost savings. Avien's Two-Unit Fuel Gage incorporates the bridge and amplifier functions into the indicator case. Less wiring and connectors are needed.

3

IT NEEDS NO FIELD ADJUSTING. With the elimination of the intermediate unit, which had to be supplied as a common part, *all* Avien units are pre-calibrated for the aircraft they are designed for.

4

IT TAKES LESS TIME TO INSTALL. The Two-Unit Gage is remarkably easy to install. No specially-trained personnel are needed. No specialized test equipment is needed. No calibration instruction or data is needed.

5

IT'S EASIER TO MAINTAIN. With fewer components in the system, less maintenance is required. Trouble-shooting becomes easier. And fewer parts must be stocked for replacement and repair.

6

IT CAN BE INTEGRATED WITH FUEL MANAGEMENT. Simulators, level switches, balancing controls, etc., can be hooked up to the Two-Unit basic system with less expense and less trouble than ever before.

6 definite ways you can cut costs with Avien's "TWO-UNIT" FUEL GAGE

Avien's Two-Unit Fuel Gage is creating a lot of talk with manufacturers, engineers, and purchasing men.

This new "package" means that Avien units are now all "shelf items." As long as the units are designed for the same aircraft, they're completely interchangeable.

The Avien Two-Unit Fuel Gage is now scheduled for production, to meet your manufacturing programs. The indicator is available in either large or small sizes, with all varieties of dial configurations.

Every month, Avien produces over ten thousand major instrument components for the aviation industry.

We believe the Two-Unit Gage is so important that your inquiry should not be delayed another day. Write or call us.

Avien

AVIATION ENGINEERING DIVISION

AVIEN-KNICKERBOCKER, INC.

58-15 NORTHERN BOULEVARD, WOODSIDE, L. I., N. Y.

New Products

Current Tester: A pocket-sized version of the Amprobe snap-around volt-amp tester which sells for $19.85 has been announced by the Pyramid Instrument Co. Called the Amprobe Junior, the new tester is available in four sizes, with scale ranges of 0-10, 0-25, 0-50, and 0-100 amperes, all at 0-125/250 volts.

Operation is identical to that of earlier Amprobe testers. To measure current without ammeter connections, trigger-operated jaws are merely snapped around one conductor, whether insulated or not, and reading is obtained. For voltage readings test leads are plugged into instrument and clipped to load.

Address: **Pyramid Instrument Corp.,** Lynbrook, N. Y.

Standard Course Checker

A low cost Standard Course Checker for verifying the accuracy of VOR omnirange signal generators which sells for $398 FOB Boonton, N. J., has been announced by Aircraft Radio Corp.

The new ARC unit, designated the H-16, is competitive with a similar device, the Collins Zifor, produced by Collins Radio Co., and is one of several developed as the result of the activity of the Radio Technical Commission for Aeronautics' special committee SC-61.

Purpose of equipment is to provide operators having more than one radio servicing facility with a means of assuring that VOR receivers, whether checked in New York, Dallas—or elsewhere, are calibrated against the same reference test signal. In use among private agencies overhauling and servicing VOR equipment, it assures that customer equipment is all calibrated against the same standard.

New course checker features a built-in self-checking circuit permitting its own accuracy to be determined in a matter of seconds each time before use. Accuracy of the H-16 is said to be within 0.1 degree at room temperature for deviations of one degree.

ARC unit measures the phase difference between the 30 cps envelope of the 9960 ± 480 cps reference modulation and of the 30 cps variable modulation. Courses checked include 0° "To" (180° "From"); 180° "To" (0° "From"); and 15° "To" (195° "From"). Amount and sense of error up to a maximum of four degrees is indicated on the panel meter.

Weight of the H-16 is 11.7 pounds and companion power supply brings the total instrument weight to 17 pounds. Input power requirements are 35 watts, 115 volts, 60 cps, and input voltage may vary from 105 to 130 volts and frequency from 50 to 70 cps.

Address: **Aircraft Radio Corp.,** Boonton, N. J.

Batteries. An aircraft battery which can be shipped and stored fully charged yet absolutely dry of electrolyte has been announced by the Gill Electric Mfg. Corp. The secret is in a development whereby the acid is removed after the battery is charged at the factory and the assembly is processed to retain the charge.

Once treated at the factory the battery requires no care until it is introduced into service, the manufacturer claims. Acid shipped in a separate container is then added with the usual water, and the battery is ready for operation without added charging.

The dry-charge batteries are specifically designed for aircraft use, and models are said to be available for all commercial aircraft and light planes.

Address: **Gill Electric Mfg. Corp.,** Redlands, Calif.

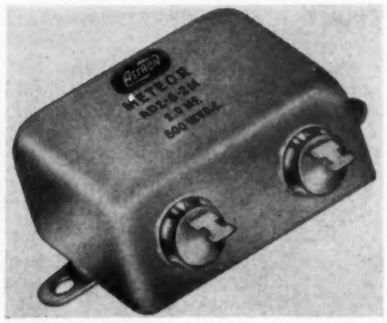
Pressure Regulator. A pressure regulator which will permit constant control of pressurized radar air systems regardless of altitude is now in production by Accessory Products Co. Called the model PJ-4 radar isobaric pressure regulator, the new Apco unit uses a system of valves controlled by three aneroid bellows, and will compensate for leakage in the radar pressure system in excess of 200 cu. in./min.

Low-temperature operation of the valve is assured by an integral thermostatically controlled heating element. Weight is two pounds; dimensions 5.75" diameter and 3.75" depth.

Address: **Accessory Products Co.,** 617 Putnam Drive, Whittier, Calif.

Valve. Allen Aircraft Products, Inc. has developed a new manifold pressure gage purge-type valve which weighs 0.085 pounds and conforms to Spec. MIL-V-6188. Of all-aluminum construction, the valve features permanent lubrication of all working parts using the Electrofilm Lub-Lok process.

Address: **Allen Aircraft Products, Inc.**, Ravenna, Ohio.



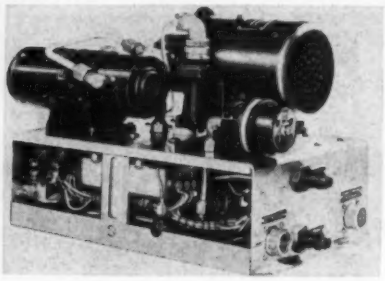
Capacitor. A paper capacitor for operation at temperatures ranging from —65° to +125°F has been produced by the Astron Corp. Called the Meteor type ADZ capacitor, the new Astron units are available in JAN-C-25 bathtub case styles CP-53 to CP-55. Glass-to-metal terminals are used to insure hermetic sealing and dependable operation at high temperatures and high altitudes.

Address: **Astron Corp.**, 255 Grant Ave., East Newark,. N. J.

VHF Receiver. A VHF communications receiver, model S2220A, designed for airports and communications centers, requires 40% less rack space than any other currently available, according to its manufacturer, Schuttig & Company.

Unit features high selectivity and sensitivity. Bandwidth at six db point is ±20 kc, and at the 60 db point is ±100 kc, it is claimed. In sensitivity, a one microvolt signal modulated 30% provides one watt audio output at 10 db or better signal-to-noise raio. Quick-response squelch circuit quiets receiver except when signals of desired strength are received.

Address: **Schuttig & Co., Inc.**, 9th and Kearny St. N. E., Washington 17, D. C.



Pressurizing. Lear, Inc., **Romec** Division, has developed a Hi-Lo Pressurizing Kit called the Model RR-9370, which permits automatic maintenance of two separate air pressures in radar and other airborne electronic equipment. The complete unit weighs 15 pounds and the air supply is provided by two pumps, one rated at ⅓ hp and another at 1/15 hp.

Unit operates from a common inlet through a silica gel hydrator which admits only dry air, and the two oil-free pumps are arranged in series to produce the relatively high capacities needed. High pressure side of the kit is compressed to 43-47 psi absolute, and the low pressure side to 13-17 psi. Model RR-9370 is capable of supercharging a one-cubic-foot vessel to 43-47 psi absolute in 10 minutes or less under conditions of a 15 cubic inch per minute leakage rate in an ambient pressure of 20" Hg absolute.

Kit includes an electrical control circuit consisting of a relay, solenoid valve, and pressure switches to satisfy the high pressure requirements before air is pumped into the low pressure side. Undue pressure drops in both high and low systems are signalled by an electrical warning switch installation.

Address: **Lear, Inc., Romec Division**, Elyria, O.

Jack. New 35-ton hydraulic jack with a patented air vent which is said to eliminate 90% of air lock difficulties has been announced by **Duff-Norton Manufacturing Co.** New jack weighs 55 pounds, 25% lighter than other types with the same capacity, according to the manufacturer.

Features of the Duff-Norton 35-ton unit are a smaller reservoir allowing for a smaller and lighter jack base; elimination of air vent screw along with the adjustments and fluid leakage it entailed; and a single pump with longer stroke, which gives more rapid lift with less pumping action.

Address: **Duff-Norton Manufacturing Co.**, Pittsburgh, Pa.

Shock Mount. Robinson Aviation, Inc., has introduced a vibration and shock mount designed for guided missile applications which uses an all-metal cushioning material called Met-L-Flex fabricated from stainless steel wire. The Robinson mount is available in load ratings between one and seven pounds per mount. A range of natural frequencies above 10 cycles per second can be provided, depending on load and performance requirements.

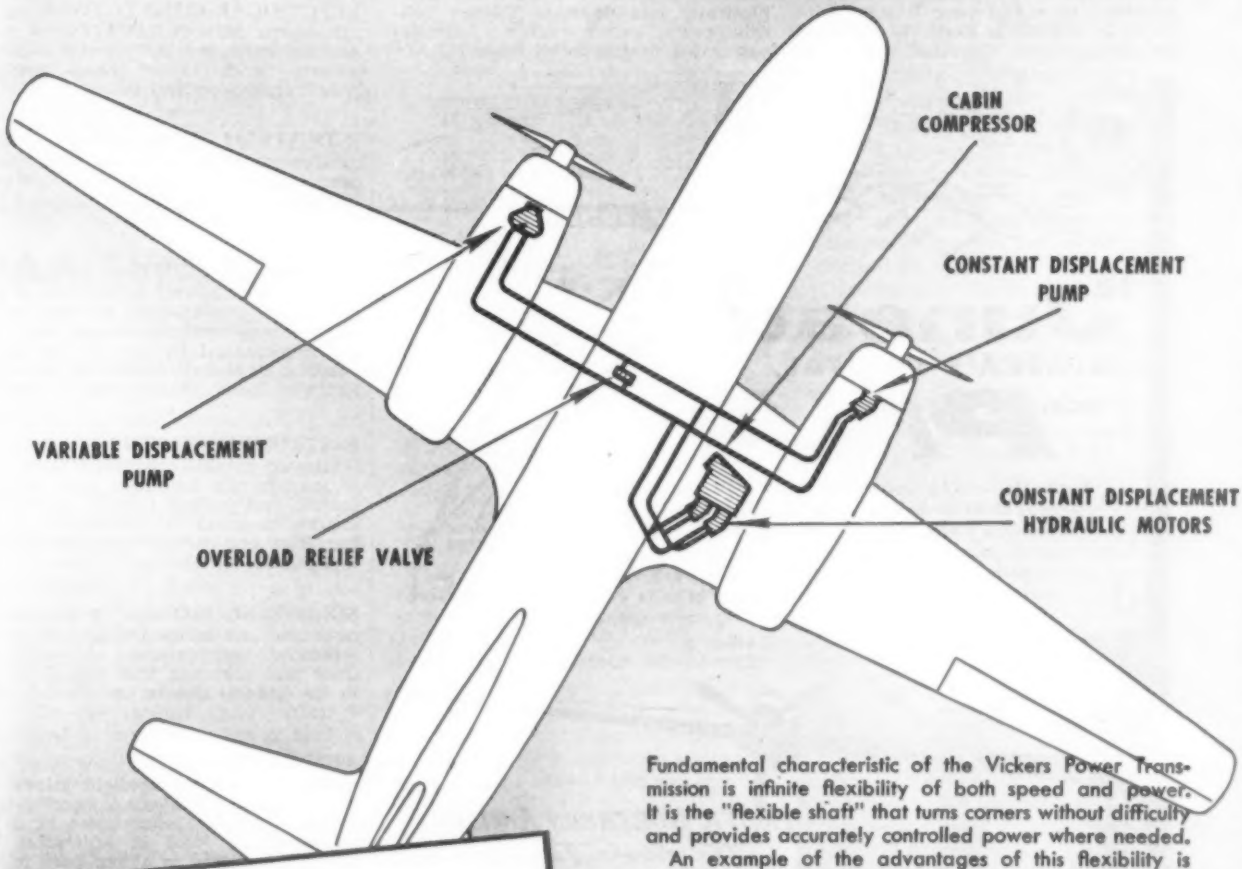
Address: **Robinson Aviation, Inc.**, Teterboro, N. J.

Furnace. High-temperature electric vacuum furnace produced by the K. H. Huppert Co. is designed for both laboratory and production applications where temperatures up to 2500° F. are required. Called the Airfre furnace, the new Hubert design is available in a variety of sizes and is completely provided with vacuum pump, variac, ammeter, timer, and automatic temperature and pressure controller.

Address: **K. H. Huppert Co.**, 6830 So. Cottage Grove Ave., Chicago 37, Ill.

VICKERS HYDRAULICS

Provides the "variable speed shaft" that turns corners with ease and delivers power where needed

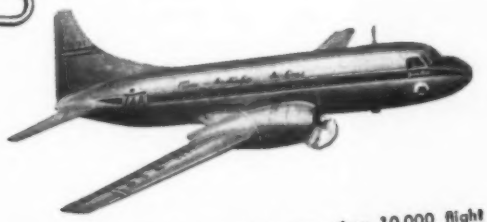


Fundamental characteristic of the Vickers Power Transmission is infinite flexibility of both speed and power. It is the "flexible shaft" that turns corners without difficulty and provides accurately controlled power where needed.

An example of the advantages of this flexibility is the drive components for the cabin compressor on Model 240 CONVAIR-LINERS. There are numerous other applications where it is desirable to transmit power to a point remote from the power source and provide selective variable speed or constant speed. These applications are easy with Vickers Transmissions.

The Model 240 CONVAIR-LINERS also use Vickers Hydraulic Pumps and Controls for the 3000 psi main hydraulic system. In Vickers complete line of aircraft hydraulic equipment, you will find a combination to meet your control or drive needs exactly. Write for your copy of report No. 725, "Hydraulic Drives for Aircraft."

Congratulations to Trans-Australia Airlines



TAA is the first Airline to accumulate more than 10,000 flight hours on each of their fleet of five CONVAIR 240's. Vickers Inc. is proud to have contributed to this record. In addition to providing the accessories for the main hydraulic system, a Vickers hydraulic drive is used for the cabin compressor. TAA recently reported that flights are flown pressurized more than 97% of the time and that hydraulic problems are insignificant.

6448

VICKERS Incorporated

DIVISION OF THE SPERRY CORPORATION

1502 OAKMAN BLVD. • DETROIT 32, MICHIGAN

ENGINEERS AND BUILDERS OF OIL HYDRAULIC EQUIPMENT SINCE 1921

Technical Literature

SHIPPING PROTECTOR: Greenwood Packaging Supply Co., 859-879 Summer Ave., Newark 4, N. J. has released a four-page folder which describes its new rubberized fiber cushioning for protecting precision parts against damage during shipment.

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HARD FACING: The production method of hard facing, said to lower maintenance and replacement costs, is presented in a four-page booklet published by Cleveland Hard Facing, Inc., 3047 Stillson Ave., Cleveland 5, O.

TITANIUM: Mallory-Sharon Titanium Corp., Niles, O., has prepared two brochures on titanium and its alloys. One deals with properties, the other with preliminary machining recommendations.

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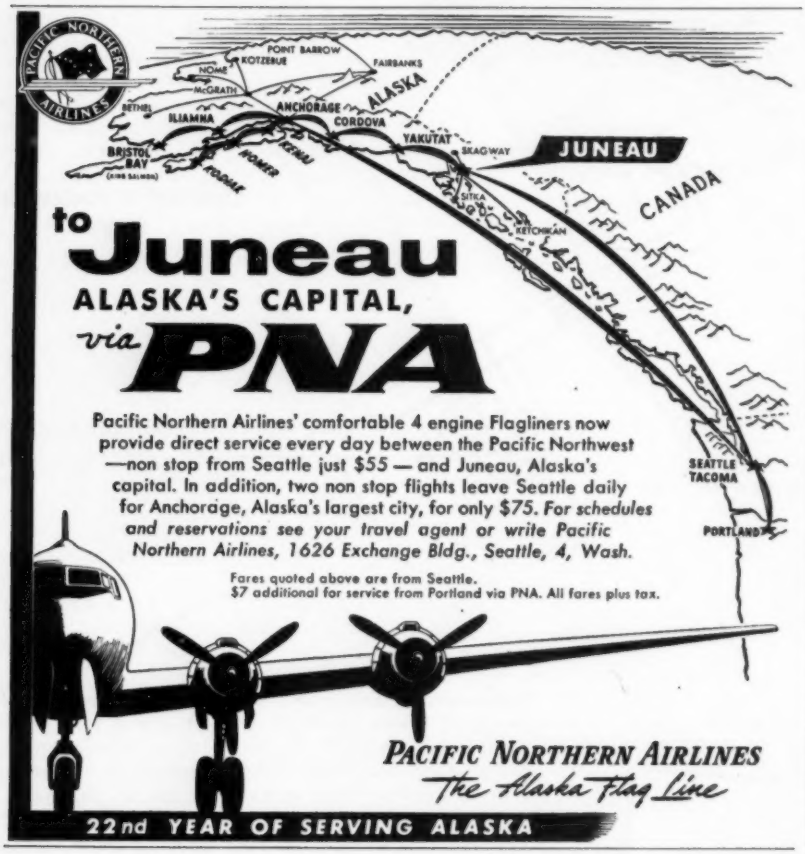
FLEXIBLE METAL HOSE: Catalog No. 200, published by Titeflex, Inc., 500 Frelinghuysen Ave., Newark 5, N. J., illustrates and describes Titeflex helically-wound and Uniflex helically-corrugated flexible metal hoses.



Van Dusen
AIRCRAFT SUPPLIES
Every Aircraft Need from ONE Source
TETERBORO, N. J. MINNEAPOLIS, MINN. BOSTON, MASS.

ELECTRICAL CONDUITS: Specifications and possible applications are included in a four-page folder on Sealtite flexible liquid-tight electrical wiring conduits, manufactured by The American Brass Co.'s American Metal Hose Branch, 692 Main St., Waterbury, Conn.

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GEAR MOTORS: GEA-1437H is a 16-page, two-color brochure describing standard types of gear motors with ratings from 1/6 to 200 hp. Prepared by the General Electric Co., Schenectady 5, N. Y.

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ELECTRICAL CONNECTORS: The AiResearch Manufacturing Co. of Los Angeles, Calif., has published a 12-page bulletin which covers the company's Williamsgrip electrical connector line.

•

INDUSTRIAL LUBRICANTS: Technical details of the industrial grades and compositions of Molykote lubricants are the feature of Bulletin 100 prepared by The Alpha Corp., Greenwich, Conn.

•

AUTOMATIC CONTROLS: "Everything Under Control" is the title of an eight-page presentation of the automatic control products manufactured by the Aeronautical Division of the Minneapolis Honeywell Regulator Co., 2600 Ridgway Road, Minneapolis 13, Minn.

•

INSTRUMENT MOTORS: A 20-page illustrated catalog describes a new line of miniaturized hysteresis synchronous, control, and damped control instrument motors, products of Servomechanisms, Inc., Post and Stewart Aves., Westbury, L. I., N. Y.

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SOLDERING IRONS: Photographs, diagrams, and tables are used to detail industrial applications of soldering irons and soldering iron tips designed by the General Electric Co., Schenectady 5, N. Y.

•

RUNWAY LIGHT: A new high intensity airport runway light known as the Thermal Beam (CAA Specification L-818), currently being tested at General Mitchell Field in Milwaukee by CAA, is described in a four-page folder put out by Line Material Co., Milwaukee 1, Wis.

•

HYDRAULIC MOTORS: Brochure A-5205 explains operation and lists basic dimensions and special design data for Vickers Incorporated's, Detroit 32, Mich., new line of standard 3,000 psi hydraulic motors for aircraft, capable of handling up to 57.8 horsepower.

•

CAPACITORS: Design and test data on AMP Capitron capacitors and pulse forming networks is the theme of a new 28-page brochure published by Aircraft-Marine Products, Inc., 2100 Paxton St., Harrisburg, Penna.

•

ELECTRONIC RELAY: General Electric Co.'s Industry Control Dept., Schenectady, N. Y., has prepared a four-page folder to detail its new electronic relay.

How Selling Expense Compared to Revenue

(in percentages)

INTERNATIONAL

	1947	1948	1949	1950	1951	1952
Atlantic Area						
AOA	17.8	18.1	20.5	19.0	...	...
PAA	17.4	18.8	20.2	22.1	20.5	21.1
TWA	15.9	16.7	17.3	19.9	22.0	22.3
Pacific Area						
PAA	14.3	18.4	19.4	17.6	15.2	16.5
NWA	22.6	14.9	17.6	15.5	17.8	16.2
Latin American Area						
PAA	18.7	19.9	20.6	19.6	20.5	20.3
Panagra	16.3	17.5	17.6	19.7	22.5	20.8
Braniff	...	18.6	23.7	23.9	23.3	26.9
C&S	29.6	20.1	21.6	24.0	20.2	18.3
Average						
All Carriers	17.6 [1]	18.1	19.8	20.1	20.3	20.3

[1] *Excludes C&S because of abnormally high ratio in first full year of operation.*

DOMESTIC

	1947	1948	1949	1950	1951	1952
American	15.01	14.08	12.88	11.34	10.39	10.98
Eastern	14.36	12.69	13.22	11.80	10.66	10.64
TWA	17.66	17.04	16.72	14.32	12.49	12.49
United	16.67	14.80	13.09	12.42	12.35	12.54

PAA, TWA Face Limit on Sales Expenses

Costs shouldn't exceed 19.5% of commercial revenues, bureau of Civil Aeronautics Board claims.

THE U. S. trans-Atlantic airlines, and perhaps carriers in other areas, may be forced to limit selling expenses to 19.5% of commercial revenues under a plan now being advocated by CAB's air operations bureau. In an area of dispute where one-half of a percentage point involves a quarter of a million dollars, the proposal contains serious implications, according to the two lines immediately involved—Pan American and TWA.

The two carriers stand to lose a combined total of about $3.5 million in selling expenses over the past few years, if the CAB adopts its staff's thinking. For the future, with airlines advocating at least a 20% selling expense ratio, losses would run between $250,000 and $300,000 for each of the carriers.

These would come about if CAB failed to allow expenses over and above the 19.5% blanket in establishing final mail rates.

Just how much of the commercial income dollar (not including mail pay) should be permitted for selling expenses has been a disputed point since 1939. But with CAB now in the midst of its most extensive rate case in history, that involving final rates for the Trans-Atlantic carriers, and with an element of subsidy still present in those rates, the matter may be decided in the most definitive terms within the next 12 months.

CAB staff lawyer Milton H. Shapiro has expressed "grave concern" over the trend in the trans-Atlantic field toward higher selling expenses. Included in that category are amounts spent for traffic and sales and for advertising and publicity.

Said Shapiro of Pan Am and TWA: "The record demonstrates that the carriers are in a vicious circle in which the results can only be the excessive expenditure of funds for selling purposes. On the other hand, the carriers should be expected to exercise the restraint necessary to prevent burdening their need for mail pay. At some point a halt must be called, and Bureau Counsel submit that for rate purposes the reasonable point is at the level of 19.5 per cent."

He introduced figures to show that both Pan Am and TWA increased their ratios from 17.4% and 15.9%, respectively, for 1947, to 21.1% and 22.3% in 1952. For comparative purposes he claimed PAA's ratio in the Pacific area for 1952 was only 16.5%, and Northwest Airlines' 16.2%. The "Big Four" in domestic operations, meanwhile, ranged from 10.64% for Eastern to 12.54% for United.

The CAB staff indicated it arrived at the 19.5% ratio by averaging selling expenses of "comparable carriers." But TWA and Pan Am term the figure "arbitrary." TWA claims, in fact, that actual selling expense of comparable carriers played "a very small part in the staff decision" because no carrier outside the Pacific area had a ratio that low in 1951 and only one carrier measured up to that standard in the year ended June 30, 1952.

TWA looks on the staff position as an assertion that all the American-flag international carriers have been engaged dishonestly, inefficiently or uneconomically in selling their services over the last two years, "an assertion that requires far more proof than a 'feeling' as to the proper level of selling expense."

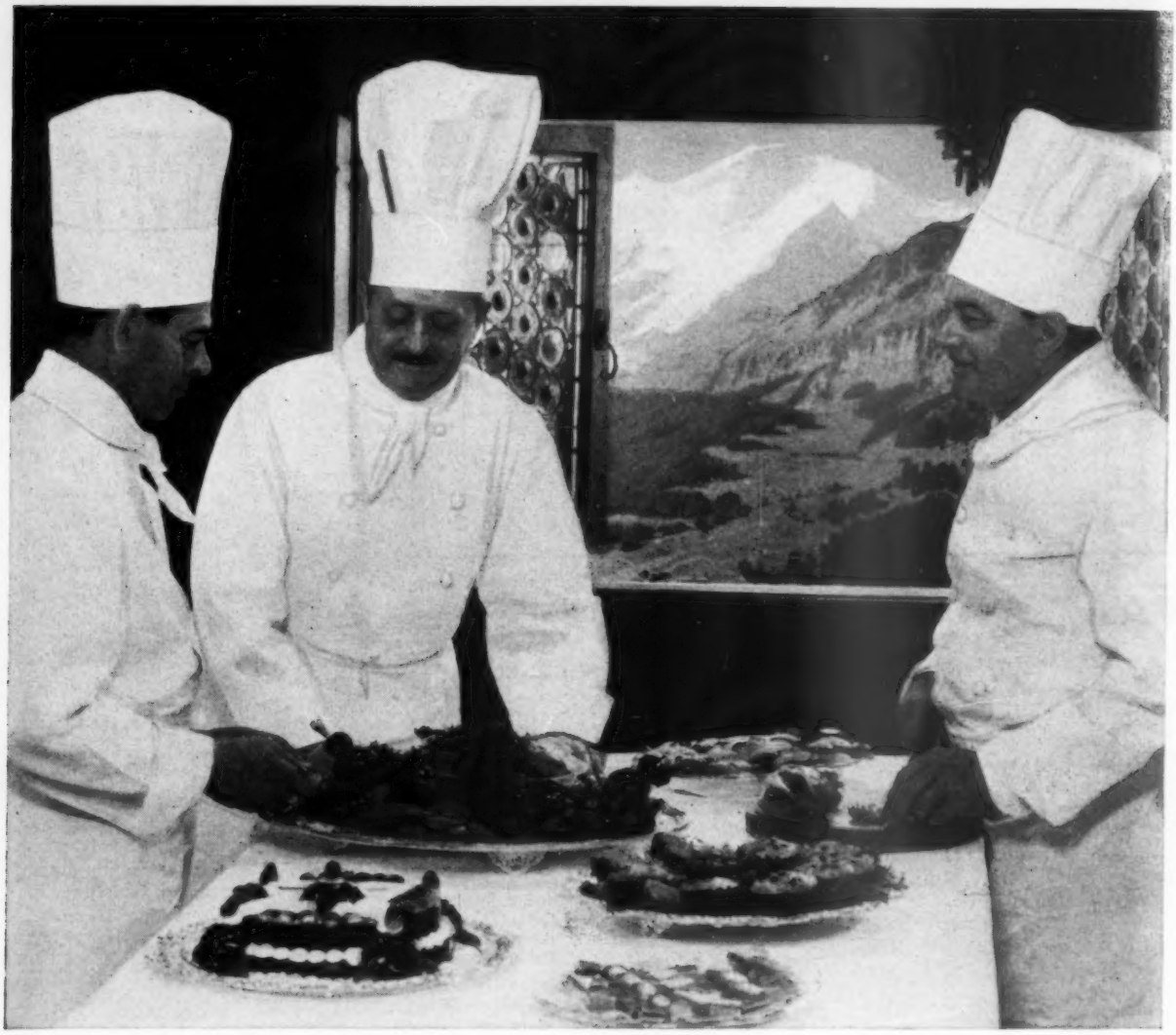
TWA also claims the Board's staff is theorizing "with the cart before the horse." To an argument that selling expense should decrease as density increases, TWA takes the position that "density is the result of increased selling effort."

Pan Am asks: "Why not 20.5%?" Since the CAB staff's 19.5% limit "is entirely arbitrary," Pan Am went on, "why not start with 20% in 1949 and increase this .5% a year through 1952. That also would be supported by the averages of the carriers generally, and would involve some recognition of the rising price levels and the increasingly severe competitive condition faced by the Atlantic area carriers."

In the case of Pan Am alone, an increase in the allowable maximum from 19.5% to 20.5% would reduce the proposed CAB disallowance by approximately $1,250,000.

Approximately $150 million in mail pay is at issue in the over-all proceeding now being considered by CAB, with the selling expense ratio argument just one of many phases. But with trans-Atlantic competition constantly increasing, the amounts that U.S. airlines may use in selling their product becomes an important problem. • • •

Elected "Miss American Aviation" in a recent contest in Birmingham, Ala., was pert Ellen Watson, Southern Airways stewardess.



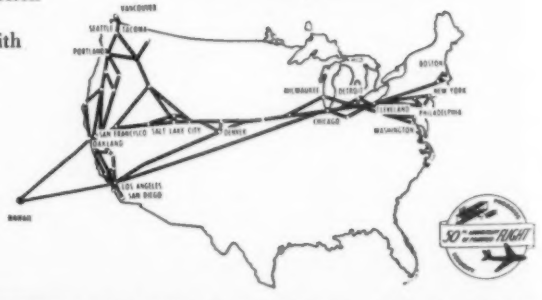
From Switzerland, France and the U. S. A.— recipes for the finest food aloft!

Famous chefs, as a rule, like to travel. They serve in the best restaurants and hotels all over the world—in order to learn how to prepare the finest foods of all countries before they finally settle down.

Nearly all the chefs who preside over United Air Lines' 12 flight kitchens were born and trained in Europe. In returning on visits they often include, with United's encouragement, a scouting trip to see "what's cooking." Just recently one of our chefs came back with dozens of new recipes gathered on a European tour.

Recipes like these, along with the most popular American dishes, are prepared in United Air Lines' own spotless, modern kitchens. Mainliner® meals, the finest food aloft, are *included* in your first class fare, which is often *less* than first class rail plus lower berth! For reservations call or write United or an Authorized Travel Agent.

UNITED AIR LINES



COMPARE THE FARE AND YOU'LL GO BY AIR. Both **FIRST CLASS** and **AIR TOURIST** service. Seats on all flights only 2 abreast on each side of a wide aisle.

Claim President Need Not Act on Balboa

A new approach to solving the complex New York-Balboa Through Service Case was presented to CAB recently by National Airlines and Braniff Airways, who now claim interchange issues in the case can be decided by CAB immediately without the need for White House action.

Although distinctly unpopular with the Pan American-Eastern-Panagra faction, the proposal of National and Braniff is that Presidential approval is necessary only on a limited route phase which centers around a Miami-Havana route award for either Braniff or Eastern.

Thus, they reason, CAB can now go ahead and (1) order a National-Pan American-Panagra interchange, (2) order a Braniff-Eastern interchange, and (3) disapprove the voluntary interchange deal between Pan Am and Eastern.

The case has been to the White House twice in the past 14 months but has never been acted on by the President. In May, it was returned to CAB so that additional evidence may be introduced. There are reports that the President was unaware that his transmittal letter to CAB would result in additional hearings.

But Pan American, Panagra, and Eastern argue strongly that there can be no denying the intent of the President's letter, and that certain procedural steps are necessary to meet that intent.

Pan Am said it would be "shocking" for CAB to grant the National-Braniff proposal after the case for two and one-half years has been argued on the basis of needing White House approval.

Eastern and Panagra also filed strongly-worded documents in opposition to by-passing the White House.

The matter is now up for CAB to decide. It can heed a Braniff request to seek a "clarification" of the Eisenhower transmittal letter or it can make its own decision as to what is contemplated by the letter as it stands. At any rate, it is another important side battle in a proceeding which ultimately could end up in the U. S. Supreme Court.

Four Carriers Fight for Hawaii Routes

The scene shifted in CAB hearings recently from the broad issue of airline service across the Pacific to the more-limited area of U. S.-Hawaii operations of U. S. flag carriers. But the dispute among carriers involved remained at the same controversial pitch.

On the "northern" U. S.-Hawaii route, i. e., from Seattle and Portland, Pan American World Airways and Northwest Airlines argued for permanent renewal of their individual certificates. But each felt there is only room for one carrier and urged non-renewal of the other's certificate.

On the "southern" route, between California and Hawaii, main issues involved United Air Lines' bid for permanent renewal of its Los Angeles-Honolulu certificate; Transocean Air Lines sought passenger and property rights out of Oakland to the Islands.

United's San Francisco-Honolulu route is now permanent and, along with permanent California-Hawaii routes of Pan Am, is not in issue in the present case.

Opposing Pan Am on the "northern" route, NWA's president Harold R. Harris said Pan Am would "favor" the shorter California route to Hawaii, because of a larger return per mile. Consistent with NWA's stand in the overall trans-Pacific proceedings, Harris urged restricting Pan Am to "southern" route.

CAB MISCELLANY

Pioneer Air Lines asked to be dropped from consideration as a possible operator for an Albuquerque-El Paso local service route because it doesn't feel the traffic potential is sufficient. Continental now has the route on a temporary basis.

• •

American Society of Travel Agents wants CAB to disapprove new commission proposal of Air Traffic Conference, which would set $1.50-$3.00 maximum on domestic sales. ASTA also wants CAB to investigate ATC's procedures.

• •

Eastern Air Lines and Dallas, Texas, are still pressing for an Eastern exemption to serve Dallas, since American Airlines has moved to Ft. Worth's new International Airport.

• •

Golden State Helicopter Service has applied to CAB for a certificate to conduct scheduled helicopter operations in the Oakland-San Francisco-Sacramento area.

• •

SABENA, the Belgian airline, wants its foreign permit changed to add Manchester, England, as an intermediate point between Brussels and New York.

CAB News

As Of Now . . .

CAB momentarily is expected to issue its decision in the Wichita Falls-Dallas Service Case, in which Continental Air Lines seeks entry to Dallas over the strong opposition of Braniff Airways. Board has changed its mind about three times on what the final decision should be.

CAB has ruled out the possibility of enlarging the Bonanza Air Lines Renewal Case to include issues related to a possible Bonanza-Southwest merger. Renewal case would become too complicated and unnecessarily delayed, CAB ruled.

It is practically certain now that the Large Irregular Air Carrier Investigation will see a final session of hearings in Washington after conclusion of hearings in Los Angeles (starting August 3) and Seattle. Thus far, two sessions of hearings in Washington and two in Miami have produced an 18,000-page record, an all-time CAB high.

CAB Calendar

Aug. 3—Hearing resumed in Large Irregular Air Carrier Investigation. Los Angeles, Calif. (Docket 5132 et al.)

Aug. 3—Hearing in Resort Airlines Miami Stopover Investigation. Washington, D. C. (Docket 5949).

Aug. 3—Hearing resumed in Personal Injury Rules Investigation. Washington, D. C. (Docket 6149).

Aug. 21—Hearing in Albuquerque-El Paso Service Case. (Continental Air Line, et al.) Washington, D. C. (Docket 5869 et al.)

Aug. 25—Hearing in Lake Central-TWA Renewal Case. Washington, D. C. (Docket 4034).

Sept. 7—Hearing in Ozark Airlines Renewal Case. Washington, D. C. (Docket 5988 et al.)

Recent CAB Decisions

Interchange agreements between United-Braniff, United-Continental for through service between Pacific Northwest and Texas-Oklahoma area approved. DC-6 equipment will be used with Denver as interchange point.

North Central Airlines, Ozark Airlines, and Transport Airgroup, Inc., recognized as potential transferees for controlling interest in and routes of Lake Central Airlines in newly instituted investigation called "Lake Central Airlines Acquisition Agreement."

Braniff Airways awarded following points of old Mid-West Airlines routes: Sioux Falls, Fargo, Brookings, Watertown, Norfolk (Nebr.), Mitchell, Yankton, Worthington, Austin-Albert Lea, and Owatonna - Faribeault - Wasecka. Also, United Air Lines authorized to serve Scottsbluff.

FINANCIAL BRIEFS

Douglas Aircraft Co. reports six-month net to May 31 of $10,042,975 on $485,778,761 sales, against $4,383,680 net on $196,019,150 sales for first half of fiscal 1952. Company raised regular dividend from 75¢ to $1 and declared special $1.50 dividend, both payable August 19 to stockholders of record July 29.

American Airlines showed net profit after taxes of $6,658,000 for six months ended June 30, compared with $5,099,000 net in same 1952 period. Revenues were up $12 million. AA declared regular $.875 dividend on $3.50 cumulative preferred stock, payable September 1 to stockholders of August 15.

Elastic Stop Nut Corp. had $766,215 earnings on $12,947,782 sales for six months ended May 31, against $742,364 net on $11,358,669 sales in same months last year.

United Air Lines declared regular 25¢ quarterly dividend on common stock, payable September 15 to stockholders of record August 15, and $1.12½ quarterly dividend on 4½% cumulative preferred, payable September 1 to stockholders of August 15.

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Airline Commentary

By Eric Bramley

THERE'S a new record (99 hours 16 minutes) for a 21,000-mile round-the-world flight on commercial airlines, set by **Horace Boren,** Braniff Airways publicity representative. Previous records were held by **Jean-Marie Audibert** (115 hours. 39 minutes), set at Paris last year, and **Tom Lanphier, Jr.,** now vice president and assistant to the president of Convair (119 hours 47 minutes), set at New York in 1949. Boren started and finished at New York, making the trip to commemorate Braniff's 25th anniversary and the 50th anniversary of powered flight.

Boren took all his schedules out of *Official Airline Guide,* used regular flights of only three airlines (TWA, BOAC, and Northwest), had only two connections (London and Tokyo), and flew on only three planes (TWA tourist Connie, BOAC Comet, NWA Stratocruiser). He made 19 stops. Schedule called for 97 hours 15 minutes, but time was lost when a passenger needed medical attention at Shemya, in the Aleutians.

Unscheduled stop at Shannon resulted in a 10-minute connection at London, where TWA's Connie parked right next to BOAC's Comet (arrangement made by radio). Boren had cabled his passport number, baggage weight, etc., to London from Shannon (also got his bag out of the hold) and thus got a fast clearance. Connection at Tokyo was 11 hours 40 minutes. For a while it looked as though an Aleutian storm would delay the flight, but the weather lifted in time.

Congratulations to Boren for making the first such trip in less than 100 hours. You can try it if you have $1,722 for a ticket.

• •

One of the better direct-mail pieces is being distributed by Western Air Lines. The sales message, on heavy cardboard 10½" by 8½", is cut up to make five pieces of a jig-saw puzzle. It's a good bet that everyone will put it together to see what it says. Another advantage is that it can be mailed in a regular-sized envelope.

• •

Here's a graphic illustration of how airline mail pay has dropped. Back in 1928, **Capt. Gene Brown** of Eastern Air Lines flew the first air mail between Atlanta and Hadley Field, N. J., in a Pitcairn Mailwing. EAL was paid $3 per pound and received $102 for the 34-pound load. The Post Office, at a postage rate of eight cents, took in $108. This year, as part of EAL's 25th anniversary celebration, Capt. Brown (now No. 1 on the pilot seniority list) flew a Pitcairn over the same route with the same sized load—34 pounds. Only this time EAL (on a 45¢ per ton-mile mail rate) received $6.30, while the PO took in $122. (If you're wondering why the PO got more money in 1953 with a six-cent postage rate than in 1928 with an eight-cent rate for the same weight of mail, it's because introduction of air mail stationery makes it possible to get more letters to a pound.) **Captain Eddie Rickenbacker,** EAL president and general manager, is framing the $6.30 check.

• •

Among the most interesting reading in airline publications these days is "Your Visit With the President" in United Air Lines News. W. A. Patterson, UAL president, undertakes to answer all questions (and they cover a wide variety of subjects) submitted by employes. The feature now takes up to three pages an issue, and it's worth the space. Pat's answers show that every question has been thoroughly considered and investigated. It's an excellent way to squash rumors and straighten out misinunderstandings.

• •

ODDS AND ENDS: The local service airline film (mentioned here before) made by American Airlines should be available for showing soon. Titled "Wings Over Dexter," it features "Eagle Airlines." Dexter is actually Watertown, N. Y., the Eagle DC-3 belongs to Mohawk Airlines, and Mohawk Capt. **John Ganley** and First Officer **Frank Navin** did all the flying. . . . Some foreign airlines are burned up over the location and size of the space allotted to them in the new East Side Airlines Terminal in New York.

People

MANUFACTURING

Rear Adm. Lawrence B. Richardson, USN Ret., a senior vice president and director of General Dynamics Corp., has joined the board of directors of Hiller Helicopters.

Benson Hamlin has joined Stanley Aviation Corp. as executive engineer charged with the administration of Stanley's guided missiles contract. Prior to joining Stanley, Hamlin was in charge of Bell Aircraft's helicopter experimental flight test program.

G. D. Welty has been appointed to the newly created post of manager of aircraft sales for the Aluminum Company of America. In his new position, Welty will be responsible for coordinating the activities of Alcoa's operating and sales departments serving the aircraft industry.

George E. Beringer, who joined Bendix Aviation Corp. as a project engineer in 1936, has been appointed general factory manager of the Aircraft Section of Bendix Products Division.

Edward M. Owen, formerly director of the flight department of Northrop Aircraft, has been named the firm's assistant director of military relations. Owen will be succeeded as flight department director by the former assistant, **Max R. Stanley.**

William MacIntyre Shakespeare, formerly with the Massachusetts Institute of Technology, has joined the Glenco Corp. as ceramic engineer in charge of development of new ceramic compositions and casting techniques.

Edward V. Albert has been named product planning engineer for transport aircraft for General Electric's Aircraft Gas Turbine Division. Albert's responsibility will be the determination of transport jet engine requirements.

J. B. Schlieman, formerly a project engineer with Chance Vought Aircraft Division of United Aircraft Corp., is now head of Chance Vought's new engineering design facility in Boston.

Frank R. Cook has been named to the newly created position of director of research and planning for the Aeronautical Division of Minneapolis-Honeywell Regulator Co.

Cook

Gragg

AIRLINES

B. B. Gragg, director of sales for United Air Lines since 1938, has been named the company's general manager of sales.

Peter E. Haas, vice president of Levi Strauss & Co. has been elected a director of Airborne Flower and Freight Traffic, Inc.

The Beaver (L.20)
AMBULANCE
We are proud of the fact that a single L-20 evacuated from a Korean battle zone over 200 litter casualties in a three-week period.
Varied missions are routine tasks for the versatile Beavers in service with U.S. Army and U.S. Air Force.
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A. S. Aldridge has resigned as United States regional traffic and sales manager for Philippine Air Lines. Aldridge, who is returning to Texas, has not yet announced his future plans.

J. M. Klapp has been appointed midwestern regional affairs manager for United Air Lines. Klapp will handle aviation matters with civic and governmental individuals in the area extending from Cleveland to Omaha.

Captain Floyd Duffey has been named manager of Transocean Air Lines' contract airlift operation for the Trust Territory of the Pacific Islands. The operation serves the Carolines from Yap to Ponape and the Marshall Islands.

Carlos Milberg is the new assistant passenger sales superintendent of Pan American World Airways' Latin American Division. Milberg, who is from Buenos Aires, will make his headquarters in Miami.

John Hodgson has been appointed assistant to D. R. Petty, United Air Lines' flight operations vice president. Hodgson will continue his headquarters at UAL's Denver Base, where for the past year and a half he has been flight manager-personnel.

The following employes have recently completed 20 years or more of service in the aviation industry:

• **Donald R. Terry,** Trans World Airlines. Supervisor, flying, New York. 20 years.

• **Gordon B. Oakley,** Trans World Airlines. Line maintenance general foreman, Albuquerque. 20 years.

• **Stanley T. Stanton,** Trans World Airlines. Captain, New York. 20 years.

• **H. L. Baird,** United Air Lines. Captain, San Francisco. 20 years.

• **L. C. Morrier,** United Air Lines. Staff supt., agency and interline sales, New York. 20 years.

• **S. R. Newman,** United Air Lines. Regional sales manager, San Francisco. 20 years.

• **G. P. Reid,** United Air Lines. Utility man, Cheyenne. 20 years.

• **W. R. Thigpen,** United Air Lines. Regional affairs manager, San Francisco. 20 years.

• **G. T. Tremble,** United Air Lines. Flight manager, Los Angeles. 20 years.

• **D. P. Wilson,** United Air Lines. Captain, San Francisco. 20 years.

Meet Your Editors

RICHE

FROM the quiet of a Parisian law school to the French Underground, battling Nazis in Soissons—from railway and waterway news reporting to the aviation industry scene—that's just a small part of the wealth of interesting experiences accumulated by AMERICAN AVIATION's Paris Editor, Jean-Marie Riche.

In the brief account of his background we received, Jean-Marie wrote "I am afraid that you won't find much in my biography to talk about to our readers." You can judge how much of an understatement he made.

Jean-Marie was born in 1921 in Soissons, France, just 60 miles north of Paris. He attended school in Belgium, obtaining his bachelor's degree in late 1937. Then he entered the Paris Law School a year later. When the war broke out, he and his family fled to Southern France. Still determined to be a lawyer, Jean-Marie managed to obtain that degree by correspondence. Conditions forbade actual law practice, and in October, 1942, he joined the French Underground army and worked with them until the Americans arrived. In recognition of his efforts he received the famed Underground medal—the Medaille de la Resistance.

Jean-Marie's experience in transportation news gathering began in 1944, doing liaison work with the 724th Railway Operating Battalion of the U. S. Army. Afterward, he joined the staff of a transportation weekly, *La Vie des Transports,* which specialized in aviation and shipping news.

Since 1945, he has been active in the transportation field and especially in building a strong background and rich experience in aviation news matters. Jean-Marie helped found the Paris Air Freight Exchange, became General Secretary of the International Federation of Independent Air Transport, and also became treasurer of the French Aviation Writers Association. He is one of the few French specialists to have flown the Vickers Viscount, the Handley Page "Hermes V" turboprop job and de Havilland's Comet I jet transport.

AMERICAN AVIATION welcomed Jean-Marie to its staff in late 1951. Since then you've seen quite a bit of his work in the International Report and numerous exclusive stories about the French as well as the overall European aviation picture.

Jean-Marie makes no claims to any special hobbies because he's been at his work from 70 to 80 hours a week since 1945. He's married—since 1943—to Yvette Fabre and they have a daughter, Francoise.

U. S. International Airline Traffic, April 1953

Airlines	Revenue Passengers	Revenue Passenger Miles	Available Seat Miles	Passenger Load Factor %	U. S. Mail Ton-Miles *	Foreign Mail Ton-Miles	Express Ton-Miles	Freight Ton-Miles	Total Ton-Miles Rev. Traffic	Available Ton-Miles Flown	% Available Ton-Miles Used	Revenue Plane-Miles	Scheduled Miles	% Scheduled Miles Completed
American	9,118	6,666,000	9,705,000	68.69	15,316	3,976	360	197,828	932,715	1,380,076	67.58	206,752	207,277	99.75
Braniff	2,600	5,970,000	14,511,000	41.14	43,313	7,925	. . . .	81,335	795,144	2,002,459	39.71	328,286	356,434	92.11
B S	2,614	3,119,000	7,043,000	44.29	5,478	990	. . . .	117,240	446,536	976,470	45.73	151,024	153,316	97.88
Colonial	6,707	5,197,000	7,473,000	69.54	1,993	685	. . . .	6,221	572,041	936,282	61.10	136,747	48,100	97.88
Eastern	11,962	17,900,000	29,467,000	60.75	43,793	. . . .	. . . .	67,353	2,052,322	3,767,093	54.48	465,704	346,636	99.53
National	7,209	3,381,000	8,241,000	41.03	4,505	. . . .	1,189	31,121	384,693	1,015,227	37.89	135,298	137,286	98.55
Northwest	5,911	9,989,000	18,252,000	54.73	103,932	27,923	13,377	730,251	1,950,311	3,150,656	61.90	527,228	524,142	93.11
Panagra	11,202	11,748,000	19,893,000	59.06	32,511	27,826	. . . .	250,453	1,599,656	2,687,833	59.51	507,085	480,533	99.31
PAA														
Latin Amer.	64,753	60,199,000	93,794,000	64.18	249,004	60,568	. . . .	2,024,039	8,151,097	13,000,105	62.70	2,080,909	1,862,262	98.43
Atlantic	66,328	55,780,000	92,923,000	60.02	476,410	128,780	. . . .	946,683	7,599,728	12,149,033	62.55	1,554,090	1,411,241	95.64
Pacific	10,235	33,886,000	56,331,000	60.16	397,066	86,196	. . . .	628,324	4,816,239	8,847,085	54.44	1,036,557	1,021,627	99.06
Alaska	4,612	4,757,000	11,467,000	41.48	34,796	. . . .	. . . .	435,314	976,628	1,725,289	56.61	260,269	251,529	99.90
TWA	16,822	40,605,000	56,351,000	72.06	380,336	160,965	. . . .	626,248	5,467,776	7,420,719	73.68	1,244,004	1,240,965	98.42
United	4,238	10,511,000	18,294,000	57.46	69,480	. . . .	. . . .	47,200	1,228,140	2,344,656	52.38	339,544	339,544	100.00
TOTALS	224,311	269,708,000	443,750,000	60.78	1,857,933	505,434	14,926	6,189,610	36,973,026	61,402,983	60.21	8,973,497	8,380,872	97.67

* Includes air parcel post.

NOTE: 1. Above figures include both scheduled and non-scheduled operations.
2. Data in above tabulations were compiled by American Aviation Publications from reports filed by the airlines with the Civil Aeronautics Board. Figures for American Airlines include that carrier's service to Mexico but not to Canada; for Braniff to South America; G & B to South America; Colonial to Bermuda; Eastern to Puerto Rico; National to Havana; Northwest to Orient and Honolulu, and United to Honolulu. Operations of U.S. carriers into Canada are included in domestic reports to CAB, in accordance with CAB filing procedures.

U. S. Local Service Airline Traffic, May 1953

Airlines	Revenue Passengers *	Revenue Passenger Miles	Available Seat Miles	Passenger Load Factor %	Mail Ton Miles	Express Ton-Miles	Freight Ton-Miles	Total Ton-Miles Rev. Traffic	Available Ton-Miles Flown	% Available Ton-Miles Used	Revenue Plane-Miles	Scheduled Miles	% Scheduled Miles Completed
Allegheny	16,762	2,348,000	5,620,000	41.77	5,388	9,905	. . .	239,283	642,242	37.26	267,601	268,832	98.40
Bonanza	6,197	1,437,000	3,642,000	39.46	1,818	1,927	2,705	144,018	362,674	39.71	145,670	145,886	98.63
Braniff*	4,995	938,000	2,010,000	46.67	2,124	2,149	3,445	97,071	200,986	48.30	83,774	85,808	97.42
Central	4,706	755,000	2,950,000	25.77	3,151	1,024	2,933	77,994	369,720	21.10	154,050	155,477	99.67
Frontier	9,900	2,540,000	7,651,000	33.20	7,684	5,468	41,399	296,815	728,786	40.73	364,408	368,218	98.14
Lake Cent.	5,526	797,000	3,575,000	22.29	2,323	8,114	. . .	84,258	390,252	21.59	162,605	165,974	97.13
Mohawk	14,686	2,388,000	4,655,000	51.30	2,626	4,504	4,994	222,287	523,912	42.43	221,684	222,777	96.24
N. Central	17,816	3,037,000	7,445,000	40.79	8,557	13,516	. . .	304,369	842,531	36.13	351,947	371,411	94.53
Ozark	10,730	1,872,000	6,311,000	29.66	3,962	5,921	. . .	184,870	622,239	29.71	251,098	259,842	96.63
Piedmont	24,427	5,156,000	11,254,000	45.81	9,544	8,259	16,790	528,119	1,287,326	41.02	536,386	529,042	99.65
Pioneer	12,690	3,645,000	8,315,000	43.84	9,522	4,097	11,935	374,215	808,381	46.29	230,966	236,158	97.80
Southern	9,705	1,677,000	5,364,000	31.26	6,518	5,585	. . .	172,527	581,145	29.69	255,392	263,818	96.63
Southwest	16,783	3,515,000	6,389,000	55.02	6,857	3,686	11,194	356,722	708,860	50.32	262,509	239,822	99.64
Trans-Texas	7,870	1,750,000	4,976,000	35.17	5,941	3,854	9,456	185,705	568,718	32.65	236,966	238,204	98.60
West Coast	15,752	2,817,000	7,169,000	39.29	3,531	2,120	4,189	259,934	692,895	37.51	341,329	344,472	99.02
Wiggins	202	23,000	139,000	16.55	75	209	. . .	2,347	13,832	16.97	33,412	47,047	68.93
TOTALS	178,747	34,695,000	87,465,000	39.67	79,621	80,338	109,040	3,530,534	9,344,499	37.78	3,899,797	3,942,788	97.51
						Helicopter Services							
HAS	. . .	. . . .	. . . .	. . .	2,726	. . .	. . .	2,726	5,767	47.27	28,790	29,234	98.48
Los Angeles	. . .	. . . .	. . . .	. . .	4,979	. . .	. . .	4,979	13,269	37.52	29,655	30,039	98.72
N.Y. Airways	. . .	. . . .	. . . .	. . .	3,323	. . .	113	3,436	8,859	38.79	22,147	30,986	71.47

* Figures cover operations of local service route 106 operated by Braniff Airways as result of Braniff-MCA merger.

NOTE: Above figures include both scheduled and non-scheduled operations.

U. S. Domestic Airline Traffic, May 1953

Airlines	Revenue Passengers	Revenue Passenger Miles	Available Seat Miles	Passenger Load Factor %	Mail Ton-Miles **	Express Ton-Miles	Freight Ton-Miles	Total Ton-Miles Rev. Traffic	Available Ton-Miles Flown	% Available Ton-Miles Used	Revenue Plane-Miles	Scheduled Miles	% Scheduled Miles Completed
American	514,045	283,826,000	406,663,000	69.79	1,463,150	865,121	3,810,882	33,275,243	53,895,748	61.74	8,642,154	8,709,053	98.50
Braniff *	101,957	38,814,000	65,532,000	59.23	158,428	95,942	276,865	4,242,891	7,370,722	57.56	1,764,923	1,940,176	89.31
Capital	205,168	64,504,000	109,199,000	59.07	289,943	246,929	349,798	6,948,031	14,792,178	46.97	2,593,898	2,601,647	97.40
Chrisair	8,634	711,000	1,332,000	53.38	1,497	. . . .	1,459	67,380	141,549	47.60	54,843	53,306	100.00
Colonial	30,752	7,900,000	13,534,000	58.37	11,779	7,530	20,133	773,593	1,529,551	50.58	389,013	335,527	97.52
Continental	32,675	13,099,000	23,438,000	55.89	43,866	16,042	76,492	1,393,418	2,894,024	48.15	714,294	687,766	99.97
Delta-C&S #	139,972	58,993,000	91,709,000	64.33	246,637	204,883	511,403	6,623,317	10,999,446	60.22	2,518,783	2,535,491	99.10
Eastern	390,507	183,910,000	308,448,000	59.62	535,444	328,393	644,734	20,134,644	41,408,797	48.62	5,667,745	5,598,597	99.22
Italian	29,731	3,874,000	7,254,000	53.40	2,989	. . . .	128,883	460,246	1,009,015	45.61	269,363	207,642	98.32
National	59,547	39,080,000	60,213,000	64.90	125,518	40,072	444,772	4,579,270	7,566,330	60.53	1,342,285	1,346,958	98.35
Northeast	30,644	6,073,000	10,692,000	56.80	9,826	12,843	24,940	596,017	1,049,920	56.77	376,852	429,563	84.53
Northwest	91,801	64,959,000	107,810,000	60.25	314,082	167,633	330,398	7,043,469	12,453,773	56.56	1,820,826	1,863,813	97.17
Pan Am Pac.	10,854	1,357,000	3,378,000	40.17	2,785	64	7,659	116,961	289,140	40.45	120,635	110,360	97.66
Trans	264,324	208,345,000	280,515,000	74.27	1,048,363	650,353	1,512,514	23,144,661	34,522,276	67.04	5,459,901	5,561,309	97.66
United	341,904	223,760,000	326,313,000	68.57	1,602,200	842,908	2,313,988	26,196,420	47,779,195	54.83	7,145,698	7,214,674	98.49
Western	67,387	28,670,000	52,654,000	54.45	124,670	63,279	136,075	3,062,430	5,976,512	51.24	1,239,900	1,243,968	99.09
TOTALS	2,319,502	1,227,875,000	1,868,684,000	65.71	5,881,177	3,541,987	10,590,995	138,657,991	243,677,176	56.90	40,121,053	40,439,850	97.83

* Braniff's figures do not include operations of local service route 106 operated by Braniff as result of Braniff-MCA merger.
# Merger between Delta Air Lines and Chicago and Southern Air Lines was effective May 1, 1953.
** Includes air parcel post.

NOTE: Above figures include both scheduled and non-scheduled operations.

INTERNATIONAL AVIATION

Edited by Anthony Vandyk

INTERCOM

A step toward the examination of passports and baggage aboard buses en route between airports and city centers has been taken by the French authorities in North Africa. Air France passengers travelling between France and Constantine, Algeria, go through customs and passport inspection aboard the special railcar which takes them from Philippeville to Constantine and vice versa (Air France serves Constantine through Philippeville airport). This summer, incidentally, Air France offers 15,000 seats each week on its services between France and North Africa.

• •

ICAO's dynamic Dr. Edward Warner has a knack for making statistics understandable. For instance, the 39,500 million passenger-kilometres flown by the world's airlines last year he explains as being equivalent to transporting seven million people (nearly the population of greater London or greater New York) from Montreal to Western Europe; from Montreal to the valley of the Amazon; or from Western Europe to Equatorial Africa or to the shores of the Persian Gulf. About one third of the total passenger movement was international, two thirds being domestic.

• •

Fly-past of over 600 aircraft at the Coronation review of the RAF represented a masterpiece of organization and flying skill. Nevertheless the procession of the planes, representing the cream of the "Queen's Air Force," brought home to observers the difference between Farnborough and the fighting strength of the RAF. Backbone of Britain's air arm is still made up of such obsolescent types as the Vampire, Meteor, Shackleton, and B-29 (the B-29's are soon to be returned to U.S.). Only modern non-foreign combat plane in large-scale use is the Canberra.

• •

A man to watch in the jet transport field is Kurt Tank, formerly chief designer of German's Focke-Wulf company (responsible for Europe's most advanced pre-war transport, the FW-200 Condor). Now in charge of jet aircraft design work at Argentina's state aircraft plant, he is seeking Argentine sponsorship for the construction of a prototype of an advanced jetliner design which would subsequently go into production in Germany.

New British DC-3 Replacement

Latest "DC-3 replacement" design comes from a British firm which has never built a complete aircraft although it has performed considerable subcontract work—Aviation Trades (Engineering) Ltd.

Aware that the future of aircraft of this type hinges on cost, the company has chosen the name "Accountant" to emphasize that economy is the keynote of the design. Work has already started on an experimental fuselage of perfectly symmetrical shape which Aviation Traders plans to achieve inexpensively by the use of a novel "petal" construction method.

The 21,000-pound-gross aircraft would be powered by two Rolls-Royce Dart turboprops, giving it a cruising speed of 315 mph over a range of 200 to 800 miles. Take-off and landing runs would be under 3000 feet. The pressurized fuselage would accommodate 22 to 33 passengers and its nose section would be hinged to facilitate loading of freight.

Meanwhile, a better-known company, Handley Page, is reported to have completed a full-size mock-up of its HPR.3 "DC-3 replacement," a derivation of the four-engine Miles Marathon. It will have three fins and rudders, a high wing (extended Marathon wing with different center section) and a round fuselage with underside flattened. Fuselage will be about 60 feet long (10 feet longer than the Marathon's). Powerplant will be the 850-hp twin-row Alvis engine now under development. HPR.3 will accommodate 32 to 44 passengers.

In Holland work is going ahead on the Fokker F.27 "DC-3 replacement" which is now offered with three alternate powerplants—Rolls-Royce Dart RDa5 turboprop, Bristol Hercules 673, and Pratt & Whitney Twin Wasp E1. As shown in the illustration, the wing of the Dutch transport has been modified. Latest weight and performance data are:

	Dart	*Hercules*	*Twin Wasp*
Empty weight	21,335	25,250	25,210
Max. gross weight (lbs.)	32,620	32,710	33,920
Max. speed (mph)	283	263	268
Max. econ. speed (mph)	254	246	244
Rate of climb, sea level (ft./min.)	1,500	1,680	1,450
Service ceiling (ft.)	35,000	28,500	24,500
Service ceiling (1 engine) (ft.)	13,100	14,700	10,600
ICAO take-off field length (ft.)	3,800	3,800	3,800
ICAO landing field length (ft.)	3,800	3,800	3,950

MODIFIED WING of Fokker F-27 is visible in drawing above.

SAAB-29 *a top-line jet fighter available for export* NOW

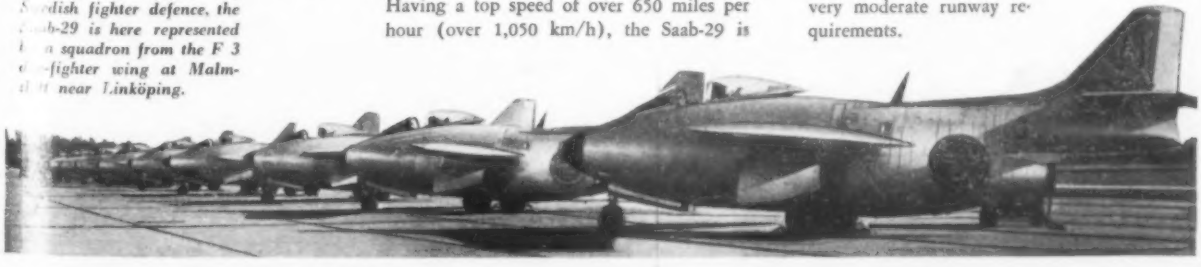
The Saab-29 takes off with a heavy armament and fuel load for a long-range attack sortie.

Forming the backbone of Swedish fighter defence, the Saab-29 is here represented by a squadron from the F 3 all-fighter wing at Malmslätt near Linköping.

Quick delivery is something quite unique when talking of *modern* jet fighters. Too often such aircraft are years away from operational service. The Swedish swept-wing Saab-29, however, represents a really outstanding exception from that "rule". The Saab-29 has been delivered in large quantities to the Royal Swedish Air Force, and many more are being produced at a fast rate.

Having a top speed of over 650 miles per hour (over 1,050 km/h), the Saab-29 is equipped with a powerful jet engine of internationally proven type. The aircraft itself has a very rugged design and a modern standard four-cannon armament of great firepower and exceptional accessibility.

The Saab-29 can be used for a variety military duties including interception, attack, and reconnaissance. For a swept-wing jet, the Saab-29 has very moderate runway requirements.



SVENSKA AEROPLAN AKTIEBOLAGET (SAAB AIRCRAFT COMPANY) · LINKÖPING · SWEDEN

INTERNATIONAL AVIATION

MANUFACTURING

• **BRITAIN:** Two more de Havilland DH 110 all-weather fighter prototypes are being built. One of the original two crashed at last year's Farnborough show. Second has resumed its flight test program after strip-down and virtual rebuilding. Royal Navy may order the DH 110.

New versions of the Bristol Britannia are expected to be announced shortly. Known as Marks 400, 500, and 600, they will gross 165,000 pounds—10,000 pounds more than the initial stretched-fuselage Marks 200, 250, and 300. Bristol's main production transport is still the twin-engine, high-wing 170 Freighter/Wayfarer; company has built 138 to date and still has a backlog of 50.

One Fairey Rotodyne has been ordered by the Supply Ministry, representing the ministry's second order for stub-wing helicopter; five Bristol 173 Mark III's are already on order (three for BEA and two for research).

Production Gloster Javelin all-weather fighters will have wing area increased by incorporating sweep-forward at the tips; wing will thus be almost crescent shaped.

• **JAPAN:** License production of the Fletcher FD-25 by Toyo Aircraft Company is under way. Company is building an initial batch of 10 planes for delivery by the end of October.

Three prototypes of a 260-hp engine suitable for light planes or helicopters are being built by the Kawasaki company.

Shin Mitsubishi is to build the Beech T-34 under license, with production of fuselages being handled by the firm's Ooye plant at Nagoya and final assembly by the Komaki factory. Originally the company planned to build the North American T-28A. Plans for Fuji Industries (Nakajima Aircraft) to produce the T-34 have been scrapped.

• **FRANCE:** SNCA du Sud-Est is to be entirely responsible for the SE 210 Caravelle twin-jet transport. Previously it had been planned that SNCA du Sud-Ouest would participate in the program, but that company is too busy with production of the SO 4050 Vautour fighter/bomber. One of the nine pre-production Vautours will be powered by Armstrong-Siddeley Sapphires instead of SNECMA Atars.

Latest SNECMA Atar, the 101F, now gives 8400 pounds thrust with afterburner. Company has developed a new pulsejet, the Escrevisse, derived from the Escopette: weight, 13 pounds; thrust, 44 pounds.

TRANSPORT

• **EUROPE:** Air France has become the world's first airline to introduce the Turbo-Compound Lockheed Super Constellation in scheduled service. Company's first (of 10) Super Connie is operating the Parisian Special de luxe trans-Atlantic schedules.

Subject to Spanish government permission, independent airline Aviacion y Comercio is to receive four Douglas DC-3's from Philippine Air Lines in return for a 20-25% stockholding.

• **LATIN AMERICA:** Compania Cubana de Aviacion has bought three Lockheed L-49 Constellations from Pan American World Airways. First plane has already been delivered and is in service on the Cuba-Europe route.

Aerovias Brasil has confirmed that it placed an order for 20 French-built Nord 2501 Noratlas transports as part of a $12,000,000 re-equipment program. New four-engine equipment—DC-6B's or Comets—is to be obtained for the Buenos Aires-Miami route. Delivery of the French planes will start in October when five will be ferried to Brazil. Five more will be delivered by January and the final 10 by June, 1954.

MILITARY

• **EUROPE:** Sweden's SAAB company is now offering the "flying barrel" J29 swept-wing jet fighter for export.

French Air Force is showing interest in the English Electric Canberra for interim use until deliveries of France's SO 4050 Vautour start.

Plans are well advanced for the production of Hawker Hunters in Holland (by Fokker) and their Rolls-Royce Avon engines in Belgium (by FN).

Japan is interested in the Percival Provost as a basic trainer for the National Security Force.

• **AUSTRALIA:** More than 100 British companies are participating in production and testing of missiles at the Woomera range. Among the aircraft firms working at Woomera and the nearby town of Salisbury are English Electric, Bristol, Fairey, and Armstrong Whitworth.

First of SABENA Belgian Airlines' Sikorsky S-55's is shown above on arrival at Antwerp. Company was scheduled to inaugurate the world's first international helicopter services this month.

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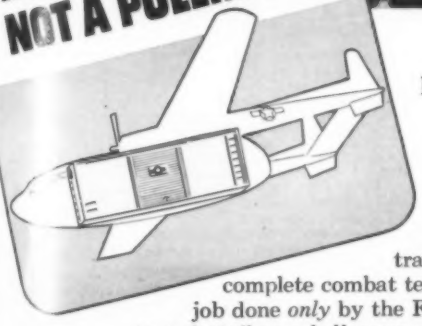

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Letters

(Continued from page 6)

REPORT ON PUERTO RICO

To the Editor:

I have just read [your] article "Puerto Rico Hitches Its Future to Aviation," and wish to congratulate you for the excellent work done in behalf of our island and its expanding aviation needs.

It is a fine piece and it gives me great pleasure to express our gratitude to you.

A. ECHEVARRIA, JR.
Director
Office of Public Relations
Economic Development Administration
San Juan, Puerto Rico

•

SPEED TRAP

To the Editor:

In your "En Route" portion of the May 25 issue of AMERICAN AVIATION you commented on the difference in elapsed time from Seattle to Los Angeles between 1928 and today. We have no quarrel with your calculations of the 1928 trip of 28 hours and 15 minutes. However, it appears that the 6:10 figure for 1953 was probably taken directly from United's public time table for flight 662 or 672, without correcting for conversion to Daylight Time at Los Angeles. Actual elapsed time on these flights is 5:10.

Evidently the change in approach by the airlines in publishing schedules in local time this summer can lead to problems in reading and interpretations.

W. L. MOORE, JR.
Supt. of Airplane Schedules
United Air Lines
Chicago, Illinois

•

FORGOTTEN MEN

To the Editor:

In your May 25 issue, Wayne W. Parrish writes that "The 'forgotten men' of civil aviation have been the airway controllers and it's time they got a break commensurate with their heavy responsibilities."

Let Publisher Parrish take time out on his sojourn around the country to inquire into the duties and responsibilities of the even "more forgotten men" of civil aviation, the airways operations specialists (communications).

CURTIS D. RILEY
P. O. Box 125
DuBois, Idaho

•

RUNWAY MATERIAL

To the Editor:

The article in the June 22 issue of AMERICAN AVIATION, "Heat-Resistant Runway Material Developed," has been extremely favorably received by the aviation industry. I must compliment you on being able to assimilate the technical details of this material so quickly and then reduce it to writing to the extent that even doubting engineers are asking searching questions.

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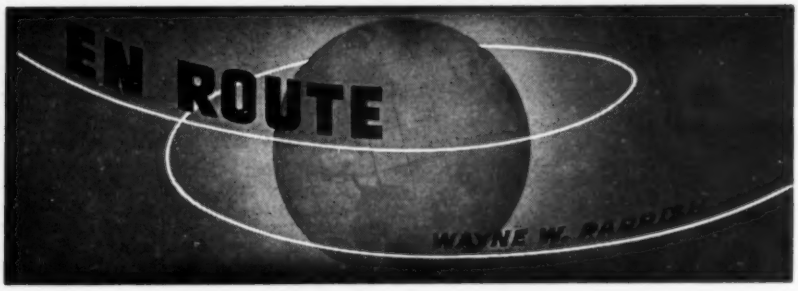

Hot Departure. When it's a blistering hot, sweaty, humid day in New York and you're leaving for Europe in mid-afternoon, how do you dress for the flight? Keep on your light summer stuff and arrive in Europe looking like a Class A mess and likely freezing to death? Or put on the heavier clothes you want to be wearing on the other side and sweat it out until plane departure in New York?

This was my problem July 1. I had gone to New York the day before to attend the swank U. S. Aviation Underwriters 25th anniversary dinner and had staked out an air-conditioned room at the Park Lane and made my decision to change to heavier clothing at the last minute before going to Idlewild.

Invariably I travel the Atlantic hop with wool flannels and a sport jacket. I must admit they were mighty uncomfortable in New York but when I arrived in Gander I was glad I had made the change. Americans with straw hats and light summer stuff look pretty uncomfortable and out of place at Gander and Prestwick. My policy will continue to be: dress for the destination point, not for the departure point.

Royal Viking. For the trip over I decided on a first class flight. Air tourist is okey, but there are times on long flights when the added comfort of first class is well worth the extra money. This time I chose the Royal Viking of Scandinavian Airlines System, than which there is none better. It didn't take long to confirm the choice—our entire DC-6 plane-load ate and drank its way to Gander.

Slowly but surely the Canadians seem to be making Gander a little more pleasurable. There's a big new cocktail lounge, new space for concessions, and even a big map of Canada, complete with electric lights. For a long time after Canada took over from the Newfoundlanders, it looked as though it was determined to make Gander the most homely, unattractive airport in the world and they all but succeeded. There is now hope that they'll continue to brighten up the place and give transients more and more to look at during the hour's stop. What a wonderful captive audience for advertising purposes!

Now if somebody will just provide up-to-date magazines and newspapers at the newsstand for passengers returning from Europe, and persuade the hired help to wipe those snottish, bored, and indifferent expressions off their faces, Gander has a future. Also, that hot water for shaving is scalding hot and is likely to burn somebody badly if it isn't tempered down a little. I still prefer to use Gander as a shaving station rather than to try to shave in an airplane.

I Like Prestwick. Good old Prestwick, Scotland, early in the morning after a nice smooth air crossing. One of the nicest airports in the world. If **Andy Murdoch** who is one of the finest dining room managers on this globe, ever should forget my face I'd feel that life was no longer worth living. It's always a pleasure to drop into the dining room and have Murdoch spot me and rush up with a truly warm smile and greeting.

Murdoch will be remembered by ferry pilots and all those others who paraded in and out of Prestwick during World War II, and what a contrast between his efficient dining service and the service at London Airport, which is about as indifferent and icy cold as the North Pole unless an airline man or somebody in aviation takes you in with an introduction, at which point the grovelling begins.

George Simpson, manager of the Prestwick Airport Hotel, who has more American friends than Americans have bill collectors, was down in London. Group Captain **David McIntyre**, an able Scotsman of distinction who has had to fight for every blessed little scrap of aviation tossed to him reluctantly by the great swollen socialistic bureaucracy of London, was in an arbitration session over the long-battled compensation which the government is to pay him and his company (Scottish Aviation, Ltd.) for Prestwick Airport. (The Ministry of Civil Aviation can't understand why it's losing money operating Prestwick; McIntyre made it pay and could easily make it pay today if given the opportunity).

I Admit I'm Biased. So **Walter Gustafson,** SAS's manager at Prestwick, put another passenger and me into a Rolls-Royce and we were driven the 40 miles to Renfrew Airport outside Glasgow to take BEA to London. I was actually heading for Paris, not London, but due to somebody's lopsided sense of humor in London it's impossible to make good connections.

It has finally been driven home to me, the hard way, that the service pattern in England is not determined for the benefit of passengers or the taxpaying public. The pattern is set to protect London traffic. You would think London would welcome all dollar-carrying passengers, no matter how they arrived. Not so. If you travel by SAS, the British will make it as tough as possible to travel to London and beyond.

Renfrew Airport at Glasgow is small. Not only that, but it's in the way of needed industrial development. It can't be expanded. Yet a new terminal building is under construction and I was driven over to see it, and unless I'm mistaken it's going to be too small the day it opens.

It would have been much smarter to concentrate expansion on Prestwick, which has good rail connections with Glasgow and excellent weather conditions, and thus give trans-Atlantic passengers and the Scotch people a break all at the same time. I admit I'm biased. Prejudiced to the roots. Even if it did make sense, which I'm sure it doesn't, I could never be convinced of the soundness of British policy toward (or should I say against) Prestwick and Scotland.

London Next. At Renfrew I boarded a BEA Viking for London and arrived on schedule at Northolt Airport and then proceeded to the office of my good friend **Tom LaPraik**, BEA's very capable and hard-working station manager, to call **Clive Adams**, BEA's imaginative and alert general sales manager. I had about an hour's stopover for the Paris flight. Adams came around to the airport and after a lot of shop talk I boarded another Viking and before I knew it I was at Le-Bourget and met by AMERICAN AVIATION'S Paris correspondent, **Jean-Marie Riche**, and **Mimi Romedenne** of TWA. (No matter whose airline I arrive or depart on at Paris I always seem to get TWA's top treatment!)

Then to the Royal Monceau Hotel, and out to dine at a small restaurant on the south bank of the Seine with Jean-Marie and his wife. Good food, good wine, and a very delicious dessert, the specialite of the house, which took a half-hour for the chef to make.

Finish in Paris. Now I think that's a fine day's effort. A neat dash of Scotland in the morning, an early afternoon hour of tea with friends in London, and a nice long evening in Paris in a typically good, small French restaurant. And then to bed in a good hotel with a warm feeling of wonder at all of the things the airplane has made possible in this cockeyed world of ours today—the easy hopping from place to place in hours, the friends in so many different countries, the variations in food and drink and customs. That's living, in my books. I wouldn't trade it for millions of cold cash.

Footnote. A few issues ago I wrote about the Casa Mateo Inn, a motel a few miles south of San Francisco Municipal Airport, which was a fine stopover for airline personnel and passengers who didn't want to take the time and trouble to go all the way into the city. I mentioned that the only drawback to this convenient arrangement was the taxicab fare, which actually amounted to more than the limousine into the city even though the distance was much shorter.

Merrell F. Stock, the manager, has dropped me a note saying that he has now established an "on-call" 24-hour free shuttle service to and from the San Francisco Airport "in recognition of the prohibitive cost of transportation." So I'm happy to pass on this good information to those of you who, like me, like to avoid long trips to town when a short overnight stop is involved.

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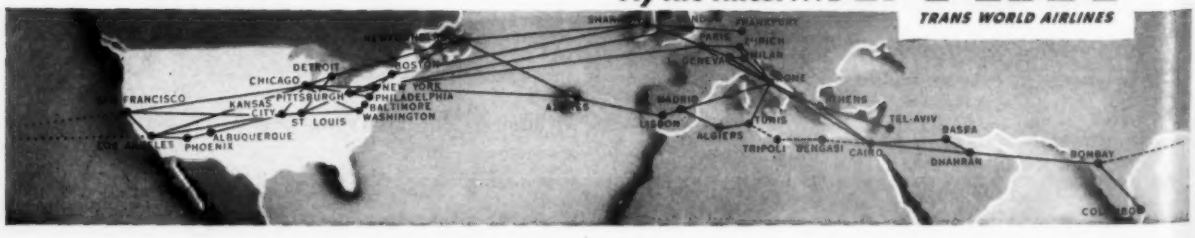

News at Deadline

Wilson Wins Battle of the Budget

Senate and House conferees were scheduled to start working this week on differences between the two versions of the Defense money bill for the fiscal year which began July 1. The Senate-approved measure for $34,511,302,000 is $77,161,500 more than the House passed, $1,260,261,000 less than President Eisenhower had requested, and $6,208,629,000 less than the budget recommendation of former President Truman. This was the breakdown:

• **USAF**—$11,247,862,500 passed by the Senate, some $199,862,500 more than the House authorized but still $40,137,500 less than the President recommended.

• **Navy**—$9,480,408,500 okayed by the Senate, about $96,025,500 more than the House but $302,254,500 below the President's revised budget.

• **Army**—$13,013,156,000 in the Senate version, up $31,156,000 from the House bill but down $657,844,000 from what President Eisenhower had asked.

• **Defense Secretary's Office**—$769,600,000 by the Senate vs. $1,019,500,000 by the House. This reduction of nearly $250 million represented the Senate's opinion that only half of the $500 million asked for standby machine tools and plants could be used in fiscal 1954.

The Senate's Defense bill added $15 million for major procurement other than aircraft, $30 million for military personnel, $35 million for research and development, and $119,862,500 for maintenance and operations to the House version for the Air Force. In the case of Naval aviation, the Senate added $25 million for aircraft and facilities and $15 million for aircraft and related procurement to the House version. Both versions of the Defense bill give the Air Force $3,495,000 for aircraft and related procurement.

A last-minute drive by several Democratic senators to add to funds for the USAF failed on two test votes. By 55-38 the Senate turned down an amendment by Sen. Burnet R. Maybank to add $400 million for 200 B-47 bombers. And Sen. Carl Hayden's attempt to add $49,120,000 for pilot training was defeated 48-41.

The defense budget, including the reduction of $5 billion for the USAF below Mr. Truman's recommendation, meant a complete victory for Defense Secretary Wilson.

Decision on C-123B May Hinge on Ridgway

A decision on whether 165 Chase C-123B's will be produced is due in the near future, according to a high Air Force official, but the word will come from the Department of Defense, since the aircraft is an Army requirement. The views of Gen. Matthew B. Ridgway, new Army member of the Joint Chiefs of Staff, who has had broad experience in airborne warfare, may have an important bearing on the outcome.

"It will be up to the Air Force where it's built," the spokesman added, however, "and we have several possibilities in mind." He declined to comment further.

Aircraft Employment Dropped in April

The number of production workers in the aircraft industry in April was 9500 less than there had been in March, according to a report by the Labor Department's Bureau of Labor Statistics. It was the first time during the course of the Korean war that industry employment had declined.

Overall payrolls fell off only 8000 for the industry, reflecting the addition of 1500 technical and clerical workers. The workers in airframes and aircraft engines and parts were the ones hit by the drop in employment; propellers and parts payrolls held steady, while the work force in other aircraft parts and equipment rose by 900.

CAB Proposes Rules For Air Carrier 'Copters

Scheduled air carrier rotorcraft certification and operation rules have been drafted by CAB's Bureau of Safety Regulations as a new CAR Part 46, which is being submitted to the industry for comments by October 30.

Patterned closely after revised Part 40 which goes into effect October 1, 1953, Part 46 prescribes special requirements for helicopters as follows:

• **Absolute altitude minimums** for VFR shall be 300 feet for day and 1,000 feet for night operations.

• **Fuel reserve** is established for a period of 20 minutes at normal cruising consumption.

• **IFR flight authorization** will be issued by the Administrator at such a time as the helicopter can meet requirements for certification for instrument flight and the air carrier's pilots are fully trained.

• **Non-visual ground navigational aids** shall be provided by the air carrier for both night and day VFR operations "on routes on which navigation cannot be conducted by pilotage."

• **Helicopters not approved for scheduled operations** must undergo a minimum of 100 hours of proving tests, of which 50 hours will be flown over authorized routes and 10 hours during night operation, in addition to certification tests. Helicopters approved for scheduled service must undergo 50 hours of service testing, with a minimum of 25 hours flown over authorized routes.

• **Sufficient heliports** must be provided for each route with two-way air/ground radio communications before an air carrier will be granted a certificate to operate.

• **Night passenger operations** in single-engine helicopters will be permitted after investigation of routes and terrain.

Japanese Jet Firm

The Japan Jet Engine Co. has been established by four Japanese firms for the development and production of gas turbines. A 7000-pound-thrust jet engine will be experimentally constructed. The new company will take over the jet engine work previously conducted by the member firms.

Atom May Power Fifth Forrestal Carrier

The fifth Forrestal-class aircraft carrier may be powered by atomic energy, according to John F. Floberg, who revealed the possibility at a final press conference before retiring as Assistant Secretary of the Navy for Air. Floberg,

who served in that post for three and one half years, qualified his reference to the atomic flat-top by adding, "I'm skeptical, but it's possible."

Major disappointment during his term of office was the Navy's jet and turbo-prop engine program, Floberg said. New Navy aircraft, however, have been entirely satisfactory, he added.

Floberg plans to rejoin his law firm as a resident partner in Washington.

Thailand Buys 1049E's

An order for two Lockheed 1049E Super Constellations has been placed with Lockheed Aircraft Corp. by Thai Airways Co., Ltd. The carrier, currently operating DC-4's, plans to operate the new aircraft between Bangkok, Hong Kong, Formosa, and Tokyo. There is also a possibility that the route might be extended to London.

Boeing Nets $9 Million

Boeing Airplane Co. has reported earnings during the first six months of the year as $9.2 million on sales of $419 million, or $5.65 a share. During the comparable period of 1952 the earnings were $5.9 million on $309 million, or $3.62 a share.

Increased production and "favorable cost experience on fixed-price contracts" were cited by William M. Allen, president, as reasons for the near doubling of the earnings figure.

Thompson Nets $2.8 Million in Quarter

Thompson Products, Inc., with a net profit for the quarter ended March 31 of $2.8 million ($2.29 a common share) expects 1953 to be a record year, according to its semi-annual report. During the first quarter of 1952 the net was only $1.7 million ($1.39 a common share).

A drop in second-quarter shipments below the level of the year before were described as reflecting "lower shipments of aircraft products in line with predictions made earlier that peak production under the defense program would be reached early in 1953."

Reorganization Voted

President Eisenhower's reorganization plan 10, transferring payment of airline subsidies from Post Office to CAB, was approved by House Government Operations Committee. No opposition to the plan was expressed at hearings. Following expected House and Senate approval, plan will be implemented October 1.

CAB Would Bar Tariff Rules on Liability

Airlines would not be able to file tariff rules relating to liability for personal injury or death to passengers, under the terms of a new regulation proposed by the CAB and now being circulated for comment by August 17.

The proposal, Draft Release No. 62, would have no effect on treaties, but would permit applicable state laws to function. After the effective date of September 1, the regulation would leave such tariff rules open to rejection as not consistent with the Act.

Liquor Sales by NWA 'Unfair', Capital Claims

Advertisement and sale of alcoholic beverages on Northwest Airlines flights has been cited by Capital Airlines in a formal complaint to the CAB as "unfair practices and unfair methods of competition," and is in violation of the laws of seven of the 10 states over which the carriers compete. Northwest called the complaint "unfounded."

Capital investigated the situation with a view to providing similar service, according to its complaint. It found such sales of alcohol forbidden in New York, Pennsylvania, Maryland, Virginia, West Virginia, Ohio, and Wisconsin. In three other states—Minnesota, New Jersey, and Michigan—such sales were restricted by licensing regulations, Capital asserts.

After Capital's president, J. H. Carmichael, wrote to NWA's president, Harold R. Harris, and received no sign that NWA would cease and desist, Capital concluded that it "could compete with Northwest in this respect only by violating the law and thereby being unfairly subjected to the risk of serious fines and penalties."

Capital Offers Plan For First-Class Mail

Latest proposal for the carriage of first-class mail by air has come from Capital Airlines. Company officials declined to reveal the rates until the plan has been submitted to the CAB, but said that there was a sliding scale depending on distance. Proposal has been submitted to the Post Office Department.

As in the case of the American Airlines proposal (see page 16), the cheaper rates would apply only to tonnage over and above that now being carried.

Japan Air Lines Acquires More DC-6A's

Japan Air Lines will soon take delivery of two Douglas DC-6A aircraft previously assigned to The Flying Tiger Line, according to JAL executive director Yoshito Kojima.

Planes will be delivered as DC-6B's, the first at the end of August and the second at the end of September. Meanwhile, another DC-6B for JAL—a converted DC-6A acquired from Slick Airways—is scheduled for delivery around August 11. An additional two DC-6B's will be delivered by Douglas Aircraft Co. in the latter part of 1954.

Transocean Air Lines will supply JAL with pilots and operational facilities for the Japanese trans-Pacific service scheduled for inauguration on November 1. Major maintenance and overhaul work will be performed initially by United Air Lines in San Francisco, eastern terminal of the JAL route from Tokyo.

Extension of the Tokyo-Wake-Honolulu-San Francisco route to Sao Paulo is unlikely to take place until late in 1954, Kojima indicated. Although JAL has announced that the extension will be via Los Angeles, Mexico City, Panama, and Rio de Janeiro, there may have to be modifications due to possible difficulties in concluding bilateral air agreements with certain Latin American countries (to date, none has been signed). If, for example, difficulty is experienced with Mexico, JAL might re-route the service via Brownsville, Texas, instead of Mexico City.

JAL has appointed Joseph J. O'Connell, Jr., former chairman of the CAB, as its Washington attorney. Application for the CAB foreign air carrier permit covering the Tokyo-San Francisco route is expected to be made within about a week. Company does not yet wish to apply for the Latin American route permit nor for a permit covering its projected North Pacific service to Seattle. Latter will probably be operated with Comet II's (JAL has two on order for delivery in the spring of 1955) and de Havilland's, according to Kojima, has indicated that a version of the Mark II with a longer range than that originally specified will be available.

Alleges Infringements

Infringements of four patents on hose-line fittings for aircraft and industrial equipment is alleged in a suit that the Aeroquip Corp. has brought against the Weatherhead Co. in the U. S. District Court in Cleveland.

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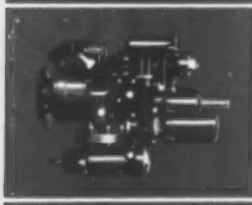

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